

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 1 of 74

Comment No. 1  
Comment noted.

Issue Code: 22

Kentucky Resources Council, Inc.

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February 1, 2002

BEFORE THE DEPARTMENT OF ENERGY  
NATIONAL ENERGY TECHNOLOGY LABORATORY

COMMENTS CONCERNING DEIS FOR PROPOSED  
KENTUCKY PIONEER ENERGY INTEGRATED GASIFICATION  
COMBINED CYCLE DEMONSTRATION PROJECT

Roy Spears  
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Dear Mr. Spears:

These comments supplement those earlier submitted into the record during the public hearing on the proposed Kentucky Pioneer Energy Integrated Gasification Combined Cycle Demonstration Project (IGCC Protect). I appreciate your commitment to accept comments through today, and offer these comments as supplemental to those submitted previously by the Kentucky Resources Council, Inc. (Council). In addition, the Council endorses comments submitted by the Kentucky Environmental Foundation, Sierra Club Cumberland Chapter and Will Herrick, which are contained in the record.

1/22

The Council is a non-profit environmental advocacy organization providing legal and technical assistance without charge to individuals and organizations in the Commonwealth on air, waste, water and resource extraction issues.

INTRODUCTION

By letter dated November 8, 2001, the Council received the *Draft Environmental Impact Statement for the proposed Kentucky Pioneer Energy Integrated Gasification Combined Cycle (IGCC) Demonstration project in Clark County, Kentucky*. According to that letter, the document was prepared "to evaluate the environmental impacts of a Clean Coal technology Program

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 2 of 74

demonstration project that is proposed to be partially funded by the Department of Energy."

The project purpose, according to that letter, is "to establish the commercial viability of the fixed bed British Gas Lurgi process in the United States and the operation of a high temperature molten carbonate fuel cell using synthesis gas."

The comment period, which was to close on January 4, 2002, was extended by notice published in the *Federal Register* on January 18, to January 25, 2002. By telephonic communication, Mr. Spears indicated to the undersigned that comments would be accepted through today, February 1, 2002.

The proposal to construct a 540 mW IGCC plant at the J.K. Smith site in Trapp, Kentucky for generation of electricity from a gases generated from a mixed waste-coal fuels, raises several threshold questions concerning the suitability of the project for expenditure of Clean Coal Technology monies, and whether the project has met applicable solid waste requirements under state law.

**1. THE PROJECT VIABILITY APPEARS CONTINGENT ON LOCAL APPROVAL BY CLARK COUNTY SOLID WASTE PLANNING UNIT; FURTHER REVIEW SHOULD AWAIT CLARIFICATION OF APPLICABILITY OF WASTE REQUIREMENTS**

The applicant has acknowledged that the use of solid waste is a component of the economics of the project, without which one would assume that the project may not be viable. Given the central role that the blending of a 50% - 80% mixture of processed waste plays in the project, the uncertainty concerning the proper characterization of the waste for state and local regulatory purposes advises that the project review be suspended until this threshold matter is resolved.

The Council was asked to address the relationship of the proposed project and the intended utilization of a shredded, milled and pelletized municipal solid waste fuel, to Kentucky's solid waste disposal statutes and the requirement of maintaining consistency with local solid waste plans.

After a review of the position paper submitted by Global Energy to the state Division for Waste Management, and after review of the applicable statute and case law, the Council believes that the facility is subject to the solid waste regulations and is required to obtain a determination of consistency from the solid waste management governing body of Clark County before importing and disposing of the solid waste fuel.

By letter dated October 9, 2000, Global Energy Inc., Suite 2000, 312 Walnut Street, Cincinnati, OH 45202, through its manager of Regulatory Affairs Dwight Lockwood, requested a determination from the Kentucky Division of Waste

**Comment No. 2****Issue Code: 14**

The stated goal of the CCT Program is to advance DOE's mission to foster a secure and reliable energy system that is environmentally and economically sustainable. As such, the CCT Program was established to demonstrate the commercial feasibility of CCTs to respond to a growing demand for a new generation of advanced coal-based technologies characterized by enhanced operational, economic, and environmental performance. Since coal is an abundant, secure and economical fuel, and is used to produce over 51 percent of the electricity in this country, it must continue in its role as a key component in the United States and world energy markets.

The Kentucky Pioneer IGCC Demonstration Project utilizes the BGL oxygen-blown, fixed-bed slagging gasifier. The gasifier fuel will be a high-sulfur bituminous coal and blended with RDF, which uses only MSW as its basic component and does not use any hazardous or industrial waste. The syngas generated in the gasifier will be used to fire a gas turbine. This project serves to further CCT Program objectives in the following ways:

1. RDF is an example of a fuel that has the potential to enhance the economics of coal utilization and lower the emissions output of a totally coal-based system. Coal-based systems that have sufficient flexibility to handle a range of fuels will have a competitive advantage over a nonfuel-flexible, coal-only system.
2. Gasification is a more environmentally efficient method to generate electricity from coal. While much was learned from the previous CCT gasification projects (Wabash River and Tampa Electric), the different technology techniques to produce syngas with flexible-fuel co-feeds have not been demonstrated and operating demonstrations are essential to accelerate the widespread use of gasification.

2/14

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**Kentucky Resources Council, Inc.**  
**Frankfort, KY**  
**Page 3 of 74**

Management as to the applicability of KRS 224.40 to the proposed "integrated gasification combined cycle (IGCC) power plant project in Clark County."

The request letter from Global Energy (Hereafter Global) asserted that the proposed project was "exempt from waste regulations." The 2-paged letter contained an attached "Analysis of the Non-Applicability of KRS 224.40 to the Kentucky Pioneer Energy IGCC Project."

The determination of applicability of the waste regulations rests in the first instance with the Natural Resources and Environmental Protection Cabinet, subject to review by the courts. KRS Chapter 224 is a statute that is remedial in nature and its protections are to be broadly construed consistent with the public and environmental protection goals of the statute. Exemptions from its reach are to be narrowly construed.

The question of whether the proposed coal and waste-fueled facility is subject to the requirements of KRS Chapter 224 as a waste management and waste disposal facility is of significance to the residents of Trapp and of Clark County, since if exempted from the ambit of the term "municipal solid waste facility," the planned importation of processed municipal solid waste from northeastern states representing the equivalent of "roughly half of the residential waste generated in the entire Commonwealth of Kentucky" will not be subject to scrutiny and a determination by the local governing body of Clark County of the consistency with that county's approved solid waste plan.

When enacted in 1991, Senate Bill 2 substantially revised state and local solid waste management, requiring of local communities that they plan for the proper management of solid waste generated within their borders and promising, in return, that the local "governing body" responsible for solid waste planning would have the ability to control the manner and extent to which waste generated outside of the boundary of that planning unit would be managed and disposed of within the planning area.

The proposal to thermally treat and to combust the volatile fraction of one million tons or more per year<sup>1</sup> of treated municipal solid waste falls squarely within the type of facility intended by the General Assembly to be scrutinized under the solid waste planning process.

KRS 224.40-315 mandates that:

No permit to construct or expand a municipal solid waste disposal facility shall be accepted for processing by the Cabinet unless the application contains a determination from

<sup>1</sup> The Public Service Commission filing by East Kentucky Power Cooperative in response to requests for information indicated a 50-50% fuel to waste feed mix at 1 million tons of each per year, while noting that the actual feed ratio may vary.

**Comment No. 2 (cont.)****Issue Code: 14**

The fuel cell demonstration has been moved to the existing Wabash River IGCC Plant near West Terre Haute, Indiana.

**Comment No. 3****Issue Code: 21**

KPE is not attempting to circumvent KRS 224, or any other state or local laws. KPE has appealed to the state for an interpretation of the language of applicable solid waste laws regarding RDF. The Kentucky Natural Resources and Environmental Protection Cabinet has determined that the RDF is a recovered material, not waste. The Kentucky Pioneer IGCC Demonstration Project facility will be considered a recovered material processing facility and the gasification process will not require a waste permit as long as the RDF conforms to the statutory definition. A discussion of this issue has been added to Chapter 6 of the EIS.

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KPE received the Final PSD/Title V Air Permit issued by the Kentucky Division for Air Quality on June 7, 2001, and will submit an application for the KPDES permit at least 180 days before commencing construction. All other permit applications required will be completed after financial closure and during the development phase of the project.

**Kentucky Resources Council, Inc.**  
**Frankfort, KY**  
**Page 4 of 74**

the governing body for the solid waste management area in which the facility is or will be located concerning the consistency of the application with the area solid waste Management plan [.]

The scope of this statute and the requirement for a determination of consistency with the approved solid waste plan is defined by the term "municipal solid waste disposal facility", which is defined in KRS 224.01-010(15) to include:

Any type of waste site or facility where the final deposition of any amount of municipal solid waste occurs, whether or not mixed with or including other waste allowed under subtitle D of the Federal Resource Conservation and Recovery Act of 1976, as amended, and includes, but is not limited to, incinerators and waste-to-energy facilities that burn municipal solid waste. . . .

The term is broadly inclusive of all types of waste sites or facilities where the final deposition of any amount of municipal solid waste occurs. There can be no serious argument that the feed material to be combined with the coal is a solid waste, which is to say, that the material is "garbage, refuse, sludge and other discarded material." The waste is to be processed, according to the applicant, at a facility in a state other than Kentucky, where it will be manufactured from municipal solid waste by removing "large objects and white goods" as well as "glass and metal [.]". The remaining material, including chlorinated plastics, will be milled and shredded.<sup>2</sup>

These "pellets" are municipal solid waste processed as an intermediate step in the thermal treatment of the waste to produce a gas for combustion. The proposed facility is utilizing a fuel stream comprised of partially separated, shredded and shaped municipal solid waste used as a fuel source, disposing of the waste through thermal treatment at high temperature to drive off the volatile fraction for combustion. As such, it is engaged in disposal of a municipal solid waste stream and falls within the ambit of a "municipal solid waste disposal facility" the siting and operation of which should be reviewed for consistency with local solid waste plans.

The applicant claimed exemption for the waste fuel from the waste program as a "recovered material," yet the clearly better reading of the statute, and the intent to carefully regulate the disposal of solid waste by thermal treatment as well as other means, militates against the exemption of the material from regulation as a solid waste. The material is not a "refuse-derived fuel" notwithstanding the claim by the applicant to the contrary, since the applicant has

3/21  
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<sup>2</sup> Subpart Eb Siting Analysis Public Meeting and Comments, pp. 7-8.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 5 of 74**

indicated that it intends to retain the recoverable plastics in the waste<sup>3</sup> (likely for the Btu value), and thus is outside of the ambit of "recovered material," since that definition specifically excludes "materials diverted or removed for purposes of energy recovery or combustion []" from being considered recovered material.

Assuming, for the sake of argument, that the waste were further processed over what is proposed, in order to meet the state definition of "refuse derived fuel" by removing all recoverable plastics and other recoverable material, such as mixed paper, corrugated paper and newsprint, the definition of "recovered material" still would not apply to exempt the entire waste stream from regulation since only 15% of the material processed by the facility creating the pellets could be credited as "RDF."

While the acceptance by the applicant of regulation under EPA's Municipal Solid Waste Combustor standards makes it difficult to accept at face value the assertion of non-applicability of state "waste" designation, commenter concurs that the state law itself determines how this facility is to be characterized for purposes of state regulation.

Because the material is not a "refuse derived fuel" under KRS 224.01-010(23) in that it has not been subject to "extensive separation of municipal solid waste" including "the extraction of recoverable materials for recycling" the processing of the municipal solid waste stream to create the palletized "fuel" does not make the material a "recovered material" under KRS 224.01-010(20). The proposed gasification step in the process and the cleaning of the volatile fraction of the waste for combustion does not make the facility a "recovered material processing facility" so as to exempt it from the definition of a municipal solid waste disposal facility or to avoid the obligation to be consistent with the local solid waste plan.<sup>4</sup>

Beyond the specific failure of the application to meet the criteria for an exempt "recovered material processing facility" because the waste feed will retain recoverable materials, including all plastics and paper, the *context* in which municipal solid waste disposal facilities are regulated under KRS Chapter 224 makes clear that the attempt to shoehorn this substantial waste-fueled energy facility into the category of a "recovered materials processing facility" is an ill-fit from a public policy standpoint. KRS 224.01-010, which contains many of the definitions for the chapter, is prefaced with the caveat "[a] s used in this chapter unless the context clearly indicates otherwise [.]". The statutory provision

<sup>3</sup> Id.

<sup>4</sup> Even assuming that the partially processed waste fell within the ambit of "refuse derived fuel" and the 15% limitation on RDF didn't limit the applicability of "recovered material" even as to RDF, the proposed facility is not a "recovered material processing facility" since it proposes to combust the gases created by the thermal and pressure treatment of the waste and is not storing and processing for resale or reuse. "Reuse," as that term is used by the General Assembly does not include use of wastes as a fuel with or without heat recovery. The latter concept is "resource recovery" and is a term distinct from "reuse of solid waste." See: KRS 224.43-010 (3) (which sets reuse of solid waste as a priority below reduction, and above recycling, composting, and resource recovery through mixed waste composting or incineration).

3/21  
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**Kentucky Resources Council, Inc.**  
**Frankfort, KY**  
**Page 6 of 74**

requiring a determination of local consistency for disposal facilities was plainly intended to cover thermal treatment of municipal solid wastes with and without energy recovery, and to segment the facility into the component processes in order to exclude from the application of KRS 224.40-315 a facility which uses a sequential process of thermal treatment followed by combustion of volatile gases, and which presents many similar concerns in management of air, water and solid waste byproducts from a heterogeneous fuel source such as municipal solid waste (even if homogenous in shape), is contrary to the intent of the statute and the public policy behind it.

In sum, the palletized mixed municipal solid waste does not fall within the ambit of the state statutory definition of "refuse derived fuel" and is thus not a "recovered material." By definition, the facility is a "municipal solid waste disposal facility" under KRS 224.40-315(1), KRS 224.40-310 and KRS 224.01-010(15).

The letter by which the Council requested a formal determination from the Division of Waste Management concerning the applicability of KRS Chapter 224 is annexed to these comments.

Subsequent to the Council's preliminary comments, the County Attorney for Clark County, the host community in which the project is proposed, has written on behalf of the Clark County Fiscal Court, seeking an opinion from the Kentucky Attorney General as to the applicability of KRS Chapter 224. A copy of that letter is reprinted below:

3/21  
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Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 7 of 74

January 29, 2002

Hon. Ron Chandler  
Office of the Attorney General  
118 Capitol Building  
Frankfort, KY 40601

Re: Global Energy, Inc., Proposed Clark County Power Plant Project  
Applicability of KRS Chapter 224

Dear Attorney General Chandler:

The proposal of Global Energy, Inc., to construct a power plant within Clark County, Kentucky, referred to hereinafter as the Kentucky Pioneer Plant, has generated a considerable amount of discussion, particular as to whether it is subject to permit by the Clark County Fiscal Court under KRS Chapter 224.

The issue, as is simply stated, is whether the proposed facility is "subject to the solid waste regulations and is required to obtain a determination of consistency" from the solid waste management governing body of Clark County before importing and disposing of the solid waste yield through thermal treatment. Attached are communications from Kentucky Resources Council, Inc. that frame the issues and discuss the proposed applicability of the statutes. Before undertaking the public hearings and permit process, the Office of the Clark County Judge/Executive has directed us to request an opinion of your office as to whether this facility falls within the guidelines such as to require permit approval of the Clark County Fiscal Court.

We would appreciate your response to this inquiry at the earliest possible date. Thank you in advance for your continued assistance in these areas.

Kindest Regards,

John H. Kerton  
Assistant Clark County Attorney

cc: Clark County Judge/Executive Drew Graham

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The Council believes that further review of the proposed project should be deferred, pending a final determination by the Natural Resources and Environmental Protection Cabinet as to the applicability of the waste statutes to the proposed facility, and a determination by the Attorney General as to whether a formal Opinion will be provided and if so, the outcome of that opinion.

Assuming that the state statutes concerning solid waste planning are applicable to the importation of the waste into the solid waste planning area for disposal, DOE should return the application to the applicant as incomplete and defer any further consideration of the requested funding until and unless the applicant provides documentation of consistency from the governing body of the solid waste management area covering Clark County of the proposed importation and utilization of the solid waste material for the facility.

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 8 of 74

Further, DOE should in that case extend to the Governing Body of that solid waste management area the opportunity to participate in any further EIS review as a cooperating agency.

## 2. PROJECT NECESSITY AND SCOPE: ALTERNATIVES MUST BE BROADENED

The necessity of funding the project and suitability of a project that proposes to displace up to 80% coal feed with pelletized garbage is another legitimate threshold inquiry, for one aspect of the environmental review and determination of reasonable alternatives is the question of whether the project as proposed is necessary, and whether the expenditure of federal funds intended to enhance rather than displace coal utilization, is appropriate.

Initially, appears that, with respect to the co-firing of municipal solid waste and coal, sufficient information exists or could be derived from comparable facilities firing comparable waste feeds without the substantial capital investment proposed in this case.

Available information suggests that this project is duplicative of another project reported to be under development by the parent company, Global Energy, in Lima Ohio, in which, according to information obtained from the EPA website, a 540 megawatt electric generation unit utilizing coal gasification and fed with a combination of coal and municipal solid waste, will be utilized.<sup>5</sup> To the extent that the Lima project is similar in technology and waste feed, an alternative that must be considered is whether the technology has been sufficiently "demonstrated" and/or whether that unit, or another unit, could be modified to demonstrate any aspects of this proposal at far lesser cost.

There are additional alternatives beyond those evaluated, that are well within the "rule of reason" established by the courts for bounding the scope of agency consideration of alternatives. The first is utilization of the Lima facility or the European counterpart facility in Germany, to demonstrate the technology, rather than providing new monies for capital construction of a facility which will be in "demonstration" mode for a brief period and which has the potential to revert with little modification to a traditional natural gas-fired plant. Either plant could be retrofitted to include the fuel cell unit.

The proposed construction of the Lima Energy Project raises a second question, which is whether DOE subsidy is necessary, since that project is proceeding without federal support. The federal Clean Coal effort has been criticized as spending taxpayer funds on projects that would have been viable without the subsidy, for technologies that were not in need of such support. In this case, it would appear that funding a 400 mW project utilizing a technology

<sup>5</sup> [www.epa.gov/swcrosp/bf/pdf/ss\\_lima.pdf](http://www.epa.gov/swcrosp/bf/pdf/ss_lima.pdf)

### Comment No. 4

Issue Code: 14

The stated goal of the CCT Program is to advance DOE's mission to foster a secure and reliable energy system that is environmentally and economically sustainable. As such, the CCT Program was established to demonstrate the commercial feasibility of CCTs to respond to a growing demand for a new generation of advanced coal-based technologies characterized by enhanced operational, economic, and environmental performance. Since coal is an abundant, secure and economical fuel, and is used to produce over 51 percent of the electricity in this country, it must continue in its role as a key component in the United States and world energy markets.

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1. RDF is an example of a fuel that has the potential to enhance the economics of coal utilization and lower the emissions output of a totally coal-based system. Coal-based systems that have sufficient flexibility to handle a range of fuels will have a competitive advantage over a nonfuel-flexible, coal-only system.
2. Gasification is a more environmentally efficient method to generate electricity from coal. While much was learned from the previous CCT gasification projects (Wabash River and Tampa Electric), the different technology techniques to produce syngas with flexible-fuel co-feeds have not been demonstrated and operating demonstrations are essential to accelerate the widespread use of gasification.

3/21  
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4/14



Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 9 of 74

and feedstock very similar to a project under construction by the parent company in a sister state without such subsidy, to be a questionable use of R&D monies.

An additional question is the extent to which the technology is in need of further demonstration. Funding of the development of a commercial coal-fired base load plant would not be an appropriate use of research and demonstration dollars, yet there is evidence in the record that the proposed technology is adequately demonstrated and that the proposal to provide federal funding is more a start-up subsidy for a commercial project than a demonstration project:

\* according to the National Coal Council, the British Gas/Lurgi (BGL) gasification process has already been demonstrated by Global Energy in Europe at the Schwarze Pumpe GmbH plant in Germany, raising the question of why the construction of this plant is being subsidized if the technology is "proven."<sup>6</sup> The project description makes much of the assertion that this will be the first commercial application of the technology in the United States, but there is no meaningful distinction to be drawn from the geographic location of the plant in or out of this country for purposes of analyzing the reliability, environmental impacts and costs of operating such a plant using the proposed waste feed. In a response to comments provided by the applicant as part of the air permitting process, the applicant indicated "This plant will be the first application in this country of the BGL technology and will be the first in this country to process RDF as well. An identically sized BGL is currently operating in Germany as part of the primary waste recycling facility in that country."

The applicant also noted that:

The main point is that the technology is well understood and has and aqueous stream cleanup technologies are well understood.

\* In response to the Public Service Commission request to provide feasibility studies for the project from East Kentucky Power Cooperative, Inc. in the Public Service Commission case of 2000-079, Dwight Lockwood of Kentucky Pioneer Energy, responding for East Kentucky Power Cooperative, stated that:

Global Energy has concluded that **the extensive operational history of both gasification and the BGL in particular, serves as an adequate demonstration of the feasibility of the technology. Commercial viability of the project is demonstrated by the Kentucky Pioneer Energy contractual commitments for the development and long-term operation of the facility.**

The enclosed brochure "Gasification of Solid and Liquid

<sup>6</sup> [www.nationalcoalcouncil.org/documents/May2001report-revised.pdf](http://www.nationalcoalcouncil.org/documents/May2001report-revised.pdf)

## Comment No. 4 (cont.)

Issue Code: 14

The fuel cell demonstration has been moved to the existing Wabash River IGCC Plant near West Terre Haute, Indiana.

4/14  
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Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 10 of 74

**Fuels for Power Generation**", by Department of Trade and Industry in the UK, presents a comprehensive analysis of gasification in general and a discussion of the various versions of gasification technology. **Information presented clearly demonstrates the technology is in place and operational.**

(Emphasis added).<sup>7</sup>

If the technology is sufficiently demonstrated that no feasibility study is deemed necessary to respond to the Public Service Commission request, how then can the DOE justify the expenditure of \$78 million of taxpayer funds to fund a "demonstration project" for a technology with "extensive operational history" that the applicant admits has had "adequate demonstration[.]"

\* The synopsis of the project on the DOE NETL website describes the technology in this way:

The technology is expected to be adaptable to a wide variety of potential market applications because of several factors. First, the BGL gasification technology has successfully used a wide variety of U.S. coals. Also, the highly modular approach to system design makes the BGL-based IGCC and molten carbonate fuel cell competitive in a wide range of plant sizes. In addition, the high efficiency and excellent environmental performance of the system are competitive with or superior to other fossil-fuel-fired power generation technologies.

Since the system design is "highly modular," one alternative that must be evaluated in addition to those proposed is to test the molten carbonate fuel cell (which accounts for a very minor relative amount of the power expected to be generated) on an existing unit, whether one of Global's or otherwise.

The consideration of alternatives must also consider alternative sites within and outside of the Commonwealth of Kentucky. The DEIS indicates that the DOE's role is limited to cost-sharing, and that this justifies the failure to consider alternative sites. In truth, the DOE support is important to the project economics, and the fact that DOE's role is a financial one rather than a permitting action does not excuse the agency from the obligation to consider a range of alternatives, including alternative sites. There is nothing unique or inherently advantageous to the proposed site; it will be importing both the coal and garbage pellets from elsewhere, and is certainly not the only site previously disturbed by industrial activity that is available. The record reflects that East Kentucky Power Cooperative, which had a contract to purchase the generated power, has received approval to construct a new unit to supply its anticipated power needs because the Public Service Commission found it reasonable for that utility not to rely on the power proposed to be generated and sold by this project.

<sup>7</sup> A copy of this response is attached to the hard copy of these comments.

## Comment No. 5

## Issue Code: 14

Comment noted. Because of DOE's limited role of providing cost-shared funding for the proposed Kentucky Pioneer IGCC Demonstration Project, alternative sites were not considered. KPE selected the existing J.K. Smith Site because the costs would be much higher and the environmental impacts would likely be greater if an undisturbed area was chosen.

4/14  
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5/14

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 11 of 74

Another area in which the DEIS is lacking in analysis is in consideration of the environmental effects of the processing of the waste fuel. The proposed project would, according to a response to comments developed by the company, use "the equivalent of roughly half of the residential waste generated in the entire commonwealth of Kentucky", with that the waste coming from out of state. The direct and indirect effects of the management and processing of that material, including air, land and water effects, must be assessed in order to determine the full range of environmental impacts associated with diversion of that waste to "fuel."

There are a number of concerns that must be assessed by DOE relative to the fuel source(s) and processing:

- What controls will be in place to assure that industrial and commercial wastes, including exempt hazardous wastes, will not be in the MSW?
- Where will the waste be processed, by whom, what QA QC controls will be in place and how will this be monitored?
- What emissions and discharges will be associated with the transportation, storage, transfer and processing of the MSW?

### 3. WASTES GENERATED BY PROJECT NEED FURTHER CHARACTERIZATION AND ANALYSIS

The project proposes to co-mingle and thermally treat two waste streams that contain many constituents of ecological and human health concern. With a heterogeneous waste stream being utilized as a fuel source, the possibility for variability in the chemical composition of the waste streams that could in turn affect combustion performance and the creation of products of combustion and of incomplete combustion that are of air toxics and waste management concern, is increased. Moisture, chlorine, and metals content may vary widely among and within these waste streams. The coal itself contains numerous metals of potential public health concern, and the fate and transport of these metals in the gasification process (including mercury) must be evaluated and addressed. The DEIS lacks appropriate assessment of the composition and fate of these constituents of concern during the thermal treatment process, including the fate of metals and chlorinated compounds released during thermal treatment.

While the processed garbage will be sized to homogenous dimensions, the chemical composition of the waste stream will vary. Yet the DEIS contains little information on the fuel composition, moisture, metals or chlorine content, variability, testing, and on the fate and transport of the products of complete or incomplete thermal treatment of this RDF/coal mixture under various blending scenarios.

#### Comment No. 6

**Issue Code: 14**

All processing of MSW into RDF would occur at the RDF supplier's facilities. The actual conversion of waste to RDF is an established process currently ongoing and is not specific to the proposed project. The process is described so that the content of the RDF can be explained. The effects of processing MSW into RDF are outside of the scope of this EIS.

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#### Comment No. 7

**Issue Code: 16**

Chapter 3, Section 3.2.2.2, of the EIS, discusses the production and composition of the RDF pellets using all available and relevant data. KPE intends to supply all RDF pellets for this project from the same manufacturer. Variation in RDF pellet composition due to different manufacturing processes should not be an issue for this project. The gasification technology used produces a very consistent syngas product, regardless of the variability of the feed. Chapter 3 explains the BGL gasification process. The RDF pellet and coal co-feed is heated in a low oxygen environment, which causes a chemical conversion process that results in the formation of the syngas. The syngas product is combusted in the combined cycle turbines to produce electricity.

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#### Comment No. 8

**Issue Code: 12**

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Gasification occurs at high temperatures and pressures using oxygen instead of air (nitrogen and oxygen) inputs. The high temperatures ensure complete destruction of toxic organic compounds. Inorganic toxic heavy metals are immobilized in molten slag and recovered by quenching as a nonleachable glassy frit. Gasification significantly reduces the formation of oxidative species such as SO<sub>x</sub> and NO<sub>x</sub>, and prevents the formation of dioxins/furans. Chloride, fluoride, mercury, arsenic, cadmium, lead, chromium, nickel and selenium have the potential to be present in the clean syngas or gas turbine exhaust. These elements usually represent less than 10 percent of input into the gasifier with coal. Nonvolatile elements such as barium, beryllium,

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 12 of 74

The DEIS must include full characterization of the fuel and the degree of variability of the fuel, and of the fate and transport of the waste under thermal treatment conditions.

The process of thermal treatment of these potentially chemically complex and variable waste streams, and of pretreatment of the resulting gas, could result in release of certain VOCs and creation of products of the treatment. The possibility of malfunctions exists, and the nature and composition of the products of partial or incomplete combustion of the RDF/coal mixture must be understood, and the fate characterized and assessed by the EIS.

Solid waste incineration releases metals, acid gases, and products of incomplete combustion. At least 217 different organic compounds have been identified in MSW incinerator emissions. Emissions during upset conditions can release compounds of concern at levels orders of magnitude higher than steady state products of thermal treatment of the wastes. The possibility of emissions of compounds of particular concern that are present in the coal and may be present also in the waste, such as mercury, and which may be created through thermal treatment of chlorinated compounds, such as dioxins and furans, must be thoroughly assessed. Monitoring and emissions data from comparable facilities burning such waste, and/or trial burn results, should be developed to determine the possibility for such emissions from this thermal treatment process during steady-state or upset conditions.

The other notable area in which the DEIS failed to adequately assess impacts was in the waste streams generated by the facility. While the applicant hopes to market the "frit," the DEIS must assume that the material will be land-disposed, and the short- and long-term impacts of the management, storage, transportation and disposal of between 500 and 1000 tons per day of the material must be assessed. Additionally, the costs of disposal of the material and the impact of these costs on project viability should be evaluated.

Partitioning, fate and transport of the metals in the waste are of concern. A Columbia University research report for the US WEPA Office of Research and development, July 15, 1983 entitled "Destruction of Toxic Organic Substances in a Slagging Gasifier Including Determination of Heavy Metals in the Slag," authored by Distefano, et al., indicated that, rather than the expected concentration of metals and ungasified components in the slag,

A preponderant fraction of the metal and metal oxides introduced with the 1:2 coal/RDF pellets was carried over with the gaseous products; part was plated out on the upper, cooler portion of the refractory gasifier lining; part was trapped out with the condensed coal tars; and a negligible fraction was present in the fritted vitreous, silico-alumina slag."

**Comment No. 8 (cont.)****Issue Code: 12**

chromium, cobalt, manganese, nickel, and vanadium are immobilized almost entirely in the vitrified frit.

7/16  
(cont.)

**Comment No. 9****Issue Code: 06**

Comment noted. All solid or liquid fossil fuels generate a vast array of organic compound emissions when combusted or subject to thermal decomposition processes. The total quantity of such compounds would be relatively low from the proposed project, as indicated by the emission estimates presented in Chapter 5, Table 5.7-1, of the EIS. These emissions are far less than those that would be produced by direct combustion of coal or RDF pellets. Table 5.7-2 summarizes emission estimates for hazardous air pollutants. The emission rate estimates presented in Tables 5.7-1 and 5.7-2 are based in part on data from similar facilities. The air quality permit allows emission limits to be exceeded during process malfunctions for no more than 2 hours.

9/06

Additional discussion of acid and metal deposition issues has been added to Section 5.7.4 for the Final EIS.

**Comment No. 10****Issue Code: 12**

Frit from other gasifiers operating on different feed stocks pass the more stringent Universal Treatment Systems criteria of the EPA-TCLP analytical method and are nonhazardous. The frit from this facility is also expected to pass the Universal Treatment Systems criteria. If it is not marketable, KPE would dispose of the frit at an industrial solid waste landfill in the State of Kentucky and bear all associated costs. KPE cannot assess waste treatment costs until the plant is designed. KPE would not know what "specific" waste disposal requirements, if any, may exist until the plant is designed, or waste disposal requirements are identified or specified by regulatory determinations. General waste disposal requirements would not be known until day-to-day plant operations begin.

10/12

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 13 of 74

The partitioning, fate and transport of the metals, and the characterization, management and disposal of lining materials and the effect of land disposal of those materials must be included as direct effects of the gasification process.<sup>8</sup> The DEIS makes no mention of this waste stream, and should evaluate from a systemic standpoint the concentration of constituents of concern in the waste feed and the fate of those constituents in the process, rather than limiting consideration to the "frit."

One metal of particular public health concern is mercury, yet it is given scant consideration. High mercury capture is available at relatively low cost from coal gasification facilities using activated carbon before syngas is burned, and should be required.

The characterization of the "frit" must include assessment of the available literature regarding short and long-term potential for mobilization of constituents of concern from the material. Among the questions to be addressed are the extent to which leaching would occur under a range of beneficial reuse or disposal conditions; including monofill or mixed-waste disposal. The applicant has indicated that the waste passes the TCLP test, but that test measures short-term leaching potential under conditions of mixed waste disposal (low pH). If the waste is land-disposed, it will likely be disposed in a monofill, and possibly under higher pH conditions. Additionally, short-term leaching tests may not fully reflect leaching potential, and longer term leaching tests under a range of pH values, should be reviewed. The variability of combustion conditions and of waste feed metals and chlorine content and the effect, if any, that these variables have on the leaching potential of the resulting frit must also be assessed.

**CONCLUSION**

The Council respectfully requests that these considerations, and the comments submitted by Will Herrick, the Kentucky Environmental Foundation, Sierra Club Cumberland Chapter and others be carefully evaluated, and that additional assessment of the full range of alternatives and effects, be undertaken in advance of a final decision on federal cost-sharing for the proposed project.

Cordially,

Tom FitzGerald  
Director

<sup>8</sup> With four planned refractory lined reactors each with an internal diameter of 12 feet, the change out and disposal of linings must be addressed but from a waste management standpoint and from a financial standpoint, since the cost of land disposal if the problems identified in the Columbia study have applicability here, may affect the project economics and project viability.

**Comment No. 11****Issue Code: 11**

10/12  
(cont.)

Most of the mercury in the gasification process would be immobilized in the frit. Chapter 3 of the EIS has been revised to discuss metal partitioning in the gasifiers.

11/11

10/12  
(cont.)

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 14 of 74**

ATTACHMENTS

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 15 of 74

Kentucky Resources Council, Inc.

Post Office Box 1070  
Frankfort, Kentucky 40602  
(502) 875-2428 phone (502) 875-2845 fax  
e-mail [FitzKRC@aol.com](mailto:FitzKRC@aol.com)

December 13, 2001

Rob Daniell  
Division of Waste Management : By fax & e-mail only  
14 Reilly Road  
Frankfort, Kentucky 40601

Re: Global Energy, Inc.  
Request for Determination Regarding Applicability  
Of KRS 224.40.

Dear Director:

After a review of the position paper submitted by Global Energy to the state Division for Waste Management, and after review of the applicable statute and case law, I believe that the facility is subject to the solid waste regulations and is required to obtain a determination of consistency from the solid waste management governing body of Clark County before importing and disposing of the solid waste fuel through thermal treatment.

By letter dated October 9, 2000, Global Energy Inc., Suite 2000, 312 Walnut Street, Cincinnati, OH 45202, through its manager of Regulatory Affairs Dwight Lockwood, requested a determination from the Kentucky Division of Waste Management as to the applicability of KRS 224.40 to the proposed "integrated gasification combined cycle (IGCC) power plant project in Clark County."

The request letter from Global Energy (Hereafter Global) asserted that the proposed project was "exempt from waste regulations." The 2-paged letter contained an attached "Analysis of the Non-Applicability of KRS 224.40 to the Kentucky Pioneer Energy IGCC Project."

The determination of applicability of the waste regulations rests in the first instance with the Natural Resources and Environmental Protection Cabinet, subject always to review by the courts. KRS Chapter 224 is a statute that is remedial in nature and its protections are to be liberally with a view towards promoting the public and environmental protection goals of the statute. *Roland v.*

**Kentucky Resources Council, Inc.**  
**Frankfort, KY**  
**Page 16 of 74**

*Kentucky Retirement Systems*, Ky.App.52 S.W.3d 579 (2001). Exemptions from its reach are to be narrowly construed.

The question of whether the proposed coal and waste-fueled facility is subject to the requirements of KRS Chapter 224 as a waste management and waste disposal facility is of significance to the residents of Trapp and of Clark County, since if exempted from the ambit of the term "municipal solid waste facility," the planned importation of processed municipal solid waste from northeastern states representing the equivalent of "roughly half of the residential waste generated in the entire Commonwealth of Kentucky" will not be subject to scrutiny and a determination by the local governing body of Clark County of the consistency with that county's approved solid waste plan.

When enacted in 1991, Senate Bill 2 substantially revised state and local solid waste management, requiring of local communities that they plan for the proper management of solid waste generated within their borders and promising, in return, that the local "governing body" responsible for solid waste planning would have the ability to control the manner and extent to which waste generated outside of the boundary of that planning unit would be managed and disposed of within the planning area.

The proposal to thermally treat and to combust the volatile fraction of one million tons or more per year<sup>9</sup> of treated municipal solid waste falls squarely within the type of facility intended by the General Assembly to be scrutinized under the solid waste planning process.

KRS 224.40-315 mandates that:

No permit to construct or expand a municipal solid waste disposal facility shall be accepted for processing by the Cabinet unless the application contains a determination from the governing body for the solid waste management area in which the facility is or will be located concerning the consistency of the application with the area solid waste Management plan [.]

The scope of this statute and the requirement for a determination of consistency with the approved solid waste plan is defined by the term "municipal solid waste disposal facility", which is defined in KRS 224.01-010(15) to include:

Any type of waste site or facility where the final deposition of any amount of municipal solid waste occurs, whether or not mixed with or including other waste allowed under

<sup>9</sup> The Public Service Commission filing by East Kentucky Power Cooperative in response to requests for information indicated a 50-50% fuel to waste feed mix at 1 million tons of each per year, while noting that the actual feed ratio may vary.



**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 17 of 74**

subtitle D of the Federal Resource Conservation and Recovery Act of 1976, as amended, and includes, but is not limited to, incinerators and waste-to-energy facilities that burn municipal solid waste. . . .

The term is broadly inclusive of all types of waste sites or facilities where the final deposition of any amount of municipal solid waste occurs. There can be no serious argument that the feed material to be combined with the coal is a solid waste, which is to say, that the material is "garbage, refuse, sludge and other discarded material." The waste is to be processed, according to the applicant, at a facility in a state other than Kentucky, where it will be manufactured from municipal solid waste by removing "large objects and white goods" as well as "glass and metal [.]". The remaining material, including chlorinated plastics, will be milled and shredded.<sup>10</sup>

These "pellets" are municipal solid waste processed as an intermediate step in the thermal treatment of the waste to produce a gas for combustion. The proposed facility is utilizing a fuel stream comprised of partially separated, shredded and shaped municipal solid waste used as a fuel source, disposing of the waste through thermal treatment at high temperature to drive off the volatile fraction for combustion. As such, it is engaged in disposal of a municipal solid waste stream and falls within the ambit of a "municipal solid waste disposal facility" the siting and operation of which should be reviewed for consistency with local solid waste plans.

The applicant claims exemption for the waste fuel from the waste program as a "recovered material," yet the clearly better reading of the statute, and the intent to carefully regulate the disposal of solid waste by thermal treatment as well as other means, militates against the exemption of the material from regulation as a solid waste. The material is not a "refuse-derived fuel" notwithstanding the claim by the applicant to the contrary, since the applicant has indicated that it intends to retain the recoverable plastics in the waste<sup>11</sup> (likely for the Btu value), and thus is outside of the ambit of "recovered material," since that definition specifically excludes "materials diverted or removed for purposes of energy recovery or combustion []" from being considered recovered material.

Assuming, for the sake of argument, that the waste were further processed over what is proposed, in order to meet the state definition of "refuse derived fuel" by removing all recoverable plastics and other recoverable material, such as mixed paper, corrugated paper and newsprint, the definition of "recovered material" still would not apply to exempt the entire waste stream from regulation since only 15% of the material processed by the facility creating the pellets could be credited as "RDF."

<sup>10</sup> Subpart Eb Siting Analysis Public Meeting and Comments, pp. 7-8.

<sup>11</sup> *Id.*

**Kentucky Resources Council, Inc.**  
**Frankfort, KY**  
**Page 18 of 74**

While the acceptance by the applicant of regulation under EPA's Municipal Solid Waste Combustor standards makes it difficult to accept at face value the assertion of non-applicability of state "waste" designation, commenter concurs that the state law itself determines how this facility is to be characterized for purposes of state regulation.

Because the material is not a "refuse derived fuel" under KRS 224.01-010(23) in that it has not been subject to "extensive separation of municipal solid waste" including "the extraction of recoverable materials for recycling" the processing of the municipal solid waste stream to create the palletized "fuel" does not make the material a "recovered material" under KRS 224.01-010(20). The proposed gasification step in the process and the cleaning of the volatile fraction of the waste for combustion does not make the facility a "recovered material processing facility" so as to exempt it from the definition of a municipal solid waste disposal facility or to avoid the obligation to be consistent with the local solid waste plan.<sup>12</sup>

Beyond the specific failure of the application to meet the criteria for an exempt "recovered material processing facility" because the waste feed will retain recoverable materials, including all plastics and paper, the *context* in which municipal solid waste disposal facilities are regulated under KRS Chapter 224 makes clear that the attempt to shoehorn this substantial waste-fueled energy facility into the category of a "recovered materials processing facility" is an ill-fit from a public policy standpoint. KRS 224.01-010, which contains many of the definitions for the chapter, is prefaced with the caveat "[a] s used in this chapter unless the context clearly indicates otherwise [.]". The statutory provision requiring a determination of local consistency for disposal facilities was plainly intended to cover thermal treatment of municipal solid wastes with and without energy recovery, and to segment the facility into the component processes in order to exclude from the application of KRS 224.40-315 a facility which uses a sequential process of thermal treatment followed by combustion of volatile gases, and which presents many similar concerns in management of air, water and solid waste byproducts from a heterogeneous fuel source such as municipal solid waste (even if homogenous in shape), is contrary to the intent of the statute and the public policy behind it.

In sum, the Council believes that the pelletized mixed municipal solid waste does not fall within the ambit of the state statutory definition of "refuse derived fuel" and is thus not a "recovered material." By definition, the facility is a

<sup>12</sup> Even assuming that the partially processed waste fell within the ambit of "refuse derived fuel" and the 15% limitation on RDF didn't limit the applicability of "recovered material" even as to RDF, the proposed facility is not a "recovered material processing facility" since it proposes to combust the gases created by the thermal and pressure treatment of the waste and is not storing and processing for resale or reuse. "Reuse," as that term is used by the General Assembly does not include use of wastes as a fuel with or without heat recovery. The latter concept is "resource recovery" and is a term distinct from "reuse of solid waste." See: KRS 224.43-010 (3) (which sets reuse of solid waste as a priority below reduction, and above recycling, composting, and resource recovery through mixed waste composting or incineration).

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 19 of 74**

"municipal solid waste disposal facility" under KRS 224.40-315(1), KRS 224.40-310 and KRS 224.01-010(15).

Commenter appreciates the Division's consideration of these comments in making a final determination as to the applicability of the waste statutes to the proposed facility.

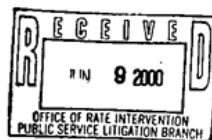
Cordially,

Tom FitzGerald  
Director

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 20 of 74**

EAST KENTUCKY POWER COOPERATIVE, INC.  
PSC CASE NO. 2000-079  
INFORMATION REQUEST RESPONSE  
PUBLIC SERVICE COMMISSION REQUEST  
DATED JUNE 1, 2000  
  
FILED JUNE 9, 2000

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 21 of 74



HAND DELIVERED

June 9, 2000

Mr. Martin J. Huelsman, Jr.  
Executive Director  
Public Service Commission  
P. O. Box 615  
Frankfort, KY 40602

Re: PSC Case No. 2000-079

Dear Mr. Huelsman:

Please find enclosed for filing with the Commission in the above-referenced case, an original and eight copies of East Kentucky Power Cooperative, Inc.'s ("EKPC") responses to the Commission's Information Request No. 3 dated June 1, 2000. These responses are based on information provided by Kentucky Pioneer Energy, L.L.C.

Very truly yours,

A handwritten signature in cursive script, reading 'Charles A. Lile'.

Charles A. Lile  
Senior Corporate Counsel

cal/lhs  
enclosures  
c: Service List  
David Brown – Kinlock

4775 Lexington Road 40391 Tel. (606) 744-4812  
P.O. Box 707, Winchester, Fax: (606) 744-6008  
Kentucky 40392-0707 <http://www.ekpc.com>

A Touchstone Energy® Partner The logo for Touchstone Energy, featuring a stylized sun or star symbol.

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 22 of 74

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED JUNE 1, 2000

In response to the following Public Service Commission's third request for information, East Kentucky Power Cooperative, Inc. (EKPC) submits responses to the questions contained therein. Each response with its associated supportive reference materials is individually tabbed.

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 23 of 74

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF EAST KENTUCKY )  
POWER COOPERATIVE, INC. FOR )  
APPROVAL OF A POWER PURCHASE ) CASE NO. 2000-079  
AGREEMENT WITH KENTUCKY )  
PIONEER ENERGY, L.L.C. )

O R D E R

IT IS ORDERED that East Kentucky Power Cooperative, Inc. ("East Kentucky"), and Pioneer Energy, L.L.C. ("Pioneer") shall file the original and 8 copies of the following information with the Commission with a copy to all parties of record no later than June 9, 2000. Each copy of the data requested should be placed in a bound volume with each item tabbed. When a number of sheets are required for an item, each sheet should be appropriately indexed, for example, Item 1(a), Sheet 2 of 6. Include with each response the name of the witness who will be responsible for responding to questions relating to the information provided. Careful attention should be given to copied material to ensure that it is legible. Where information requested herein has been provided along with the original application, in the format requested herein, reference may be made to the specific location of said information in responding to this information request.

1. Provide the feasibility studies for the project.
2. Provide a copy of the Tender Specification Documents ("TSD") of the construction contractor. Provide the design and engineering of the process if it is not

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 24 of 74

included in the TSD. Were the characteristics of Kentucky-produced coal considered in the selection of the type of process and equipment?

3. Provide the estimated budget for the project.
4. Provide the preliminary schedule for the project and estimated date of construction.
5. Provide the ratio of the coal to solid waste.
6. Will the solid waste be combined with coal to produce a briquette or will the solid waste be converted into gas and then processed with the coal? Explain the process to be used.
7. Will Kentucky coal be used exclusively for the briquettes? If yes, describe the term of contracts that are expected to be signed.
8. How much coal and how much solid waste are anticipated to be utilized on an annual basis?
9. Where will the solid waste and coal be stored and where will the briquettes be made?
10. Will all the solid waste originate in Kentucky or will out-of-state solid waste be imported?
11. What is the range of specifications for the coal that can be used in this gasification process? What are the specifications of the coal that will be used in this process?
12. Describe the type of purification system for the produced gas.
13. What is the estimated gas yield in Btu's gas per unit weight of coal and unit weight of solid waste?



Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 25 of 74

14. What is the estimated annual operating cost of the plant?
15. Explain the type of process that will be used for coal gasification.
16. Provide the operating manual, if available.
17. What is the gasification media (e.g., air, oxygen, steam)?
18. What is the estimated cost of the synthetic gas per million Btu?
19. If the proposed combustion turbine is operated exclusively on natural gas, what is the maximum gas consumption per hour and what is the maximum quantity of gas per hour available at the site for this combustion turbine?

Done at Frankfort, Kentucky, this 1st day of June, 2000.

By the Commission

ATTEST:

  
Executive Director

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 26 of 74**

1 6  
1 6

**TAB 1**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 27 of 74

PSC Request 1

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 1

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 1. Provide the feasibility studies for the project.

Response 1. Global Energy has concluded that the extensive operational history of both gasification in general and the BGL in particular, serves as an adequate demonstration of the feasibility of the technology. Commercial viability of the project is demonstrated by the Kentucky Pioneer Energy contractual commitments for the development and long-term operation of the facility.

The enclosed brochure "Gasification of Solid and Liquid Fuels for Power Generation", by Department of Trade and Industry in the UK, presents a comprehensive analysis of gasification in general and a discussion of the various versions of gasification technology. Information presented clearly demonstrates the technology is in place and operational.

Kentucky Pioneer Energy economic modeling and engineering work are subject to international contractual secrecy agreements and are therefore business confidential and not available.

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 28 of 74

# TECHNOLOGY STATUS REPORT

## GASIFICATION OF SOLID AND LIQUID FUELS FOR POWER GENERATION

CLEANER COAL  
TECHNOLOGY  
PROGRAMME

TSR  
008

DECEMBER 1998

**dti**  
Department of Trade and Industry

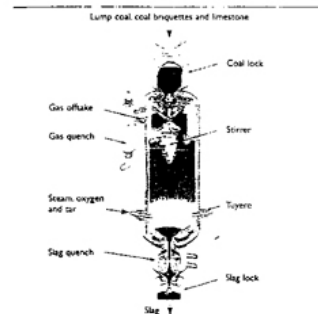
Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 29 of 74GASIFICATION OF SOLID AND LIQUID  
FUELS FOR POWER GENERATION

Figure 1. The BGL gasifier (courtesy of BGL plc)

**SUMMARY**

Gasification is the conversion of solid and liquid materials (eg coal or oil) into a gas whose major components are hydrogen ( $H_2$ ) and carbon monoxide (CO). Gasification has been employed for over a hundred years with the gas produced being used for various applications such as domestic heating and lighting ('Town Gas'), chemicals manufacture, eg ammonia ( $NH_3$ ) or methanol, and the production of petrol- and diesel-substitutes.

In recent years, there has been interest in using gasification to generate electricity. The initial reason for this was the development of large, efficient gas turbines. It was soon realised that the gasification of coal, coupled with a gas turbine, could potentially generate power as efficiently as the most modern conventional coal-fired power plant, but with much lower emissions. The first experimental integrated gasification combined cycle (IGCC) power plant was built in the early 1970s in Germany, and today there are several coal-fired demonstration plants worldwide.

IGCC power plants can also be fired with oil-derived feedstocks such as heavy oils and tars. These products are formed during oil-refining processes. Traditionally, these products have been used to manufacture heavy fuel oils for use in power station boilers and as marine fuel. However, the market for heavy fuel oil has declined rapidly in recent years, and some refineries now have a surplus of such products. Gasifying these heavy oils can provide both power for the refinery, and for export, and  $H_2$  which can be used within the refinery to upgrade and clean other products, such as diesel and petrol. There are at least four major oil IGCC projects active in Europe.

Both biomass and wastes can be gasified; however, IGCC technology tends to favour large, centralised power plants whilst biomass and wastes are best exploited using smaller plants close to their source. An

alternative, therefore, is to gasify the biomass or waste in a small gasifier adjacent to an existing power plant and use the gas produced to partially replace the coal or oil being fired. This allows an existing power station to utilise biomass and wastes as and when they are available. Some gasifier technologies allow biomass and wastes to be co-gasified with coal. Several biomass and waste gasification projects are currently going ahead, mostly in Europe, with several of the most important in the UK.

IGCC plants are still at the demonstration stage and nearly all of the projects so far have required some form of Government support. The technology has three major deficiencies that need to be remedied before it becomes widely used:

- i. IGCC plants are expensive to build, costing significantly more than conventional coal-fired plants with environmental protection equipment.
- ii. IGCC plants have so far suffered from relatively poor reliability.
- iii. The operational flexibility of IGCC plants at least those with oxygen ( $O_2$ ) plants - has yet to be fully proven, in particular, the start-up times for IGCC plants are measured in days rather than hours.

Further development work is required to overcome these obstacles to the uptake of the technology. When they have been overcome, IGCC plants should take a significant market-share of new coal-fired power plants worldwide.

**BENEFITS OF THE TECHNOLOGY**

Gasification technologies offer the following benefits:

- highly efficient and clean generation of power from coal
- clean generation of power from oil residues with substantial scope for integration with refinery activities
- environmentally benign disposal of solid and liquid wastes with scope for further energy recovery
- utilisation of biomass for power production

**DEPARTMENT OF TRADE AND INDUSTRY SUPPORT**

Since 1990, the Department of Trade and Industry (DTI) has supported 49 projects associated with gasification for power generation, contributing £10.9M to a total projects cost of £36.6M.

**INTRODUCTION****Gasification**

Gasification is the conversion of a carbon-containing solid or liquid substance into a gas in which the major components are  $H_2$  and CO. This gas can then be used as a fuel or as a chemical feedstock from which products such as  $NH_3$  or methanol can be made.

The defining chemical characteristic of gasification is that it entails the partial oxidation of the feed material; in combustion, the feed is fully oxidised, whilst in pyrolysis, the feed undergoes thermal degradation in the absence of  $O_2$ .

The oxidants for gasification are  $O_2$  or air and, usually, steam. Steam helps to act as a temperature moderator, as the reaction of steam with the carbon in the feed is endothermic (ie it absorbs heat). The choice of air or pure  $O_2$  depends on a number of factors such as the reactivity of the feed material, the purpose for which the gas is to be used and the type of gasifier.

The first major application of gasification was to convert coal into a fuel-gas for domestic lighting and heating. This application has gradually died out in most places due to the availability of natural gas, although gasification is still used for this purpose in China (and until recently in Eastern Europe). For the last few decades, the main application of gasification has been in the petrochemical industry to convert various hydrocarbon streams into 'synthesis gas', eg for the manufacture of methanol, the supply of  $H_2$  for  $NH_3$  production or the hydrosulphurisation or hydrocracking of oil streams. Other, more specialised uses of gasification have included the conversion of coal into synthetic motor fuels (as practised in South Africa) and the manufacture of substitute natural gas (SNG) not practised commercially at present but given serious consideration in the late 1970s and early 1980s.

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 30 of 74

## GASIFICATION PROCESSES

Types of Gasification  
Process

There are many different gasification processes on offer. These differ considerably in terms of, for example, technical design, scale, reference experience and fuels handled. The most useful way of classifying them is by flow regime, i.e. the way in which the fuel and oxidant flow through the gasifier.

Just as conventional solid-fuel boilers may be divided into three basic types (namely oil-fired, fluidised bed and grate-fired), gasifiers fall into three groups: entrained flow, fluidised bed and moving bed (sometimes called, somewhat erroneously, fixed bed). Fluidised bed gasifiers are exactly analogous to fluidised bed combustors; entrained flow gasifiers are similar in concept to pit-heating, and moving bed gasifiers bear some resemblance to grate firing. Characteristics of each are compared in Table 2.

	Entrained flow	Fluidised bed	Moving bed
Fuel types	Solid and liquid	Solid	Solid
Fuel size (solid)	<500µm	0.5-5mm	3-50mm
Fuel residence time	1-10s	5-50s	15-30min
Gas outlet temperature	900-1400°C*	700-900°C	400-500°C

Table 2 Comparison of gasifier types

## Entrained Flow Gasifiers

In an entrained flow gasifier, pf or atomised of flows co-currently with the oxidising medium (typically  $O_2$ ). The key characteristics of entrained flow gasifiers are their very high and uniform temperatures (usually more than 1000°C) and the very short residence time of the fuel within the gasifier. For this reason, solids fed into the gasifier must be very finely divided and homogeneous, which in turn means that entrained flow gasifiers are not suitable for feedstocks such as biomass or wastes, which cannot be readily pulverised. The high temperatures in entrained flow gasifiers mean that the ash in the coal melts and is removed as a molten slag. Entrained flow gasifiers are well suited to gasifying liquids, and the primary application of such gasifiers today is in refineries, gasifying oil-feedstocks.

Entrained flow gasifiers have been selected for nearly all the coal- and oil-based GPPs currently in operation or under construction. Entrained flow gasifiers include the Texaco gasifier; the two variants of the Shell gasifier (one for coal, the other for oil); the Preform® gasifier and the Destec gasifier. Of these, both the Texaco gasifier and the Shell oil gasifier have over 100 units in operation worldwide.

## Fluidised Bed Gasifiers

In a fluidised bed, solids (eg coal, ash) are suspended in an upwardly flowing gas stream. In a fluidised bed gasifier, this gas stream comprises the oxidant (normally air rather than  $O_2$ ). The key feature of the fluidised bed gasifier (like the fluidised bed combustor) is that the fuel ash must not be allowed to become so hot that it melts and sticks together; if the fuel particles stick together, the bed will defluidise. The use of air as the oxidant keeps the temperature below ~1000°C. This in turn means that fluidised bed gasifiers are best suited to relatively reactive fuels, such as biomass.

Advantages of the fluidised bed gasifier include the ability to accept a wide range of solid feeds, including household waste (suitably pre-treated) and biomass such as wood. It is also to be preferred for very high ash coals, particularly those in which the ash has a high melting point, because other gasifier types (entrained flow and moving bed) lose significant amounts of energy in melting the ash to form slag.

Fluidised bed gasifiers include the high temperature Winkler (HTW) and that developed by British Coal Corporation and now marketed by Mitsui Babcock Energy Ltd (MBEL) as part of the Air blown Gasification Cycle (ABGC). There are relatively few large fluidised bed gasifiers in operation. Fluidised bed gasifiers are not suitable for liquid feeds.

## Moving Bed Gasifiers

In a moving bed gasifier, the oxidant (steam and  $O_2$ ) is blown into the bottom of the gasifier. The raw fuel-gas produced moves upward through a bed of solid feedstock, which gradually moves downwards as the feed at the bottom of the bed is consumed. The defining characteristic of moving bed gasifiers is therefore counter-current flow. As the raw fuel-gas flows through the bed, it is cooled by the incoming feed, which in turn is dried and devolatilised. There is therefore a very pronounced temperature profile in the gasifier, from 1000°C or more at the bottom to perhaps 500°C at the top. The devolatilisation of the fuel during the gasification process means that the outgoing fuel-gas contains significant amounts of tarry compounds and methane. This raw fuel-gas is therefore washed at the outlet with water to remove the tars. As a consequence of this, the fuel-gas does not require high-temperature cooling in a syngas cooler, as it would if from an entrained flow reactor. Moving bed gasifiers were designed for coal, but can accept other solid fuels, such as wastes.

There are two main moving bed gasifier technologies. The Lurgi dry-ash gasifier was originally developed in the 1930s and has been used extensively for town gas production and in South Africa for chemicals from coal. In this gasifier, the temperature at the bottom of the bed is kept below the ash fusion point so the coal ash is removed as a solid. In the 1970s, Lurgi and the then British Gas Corporation (now BG plc) developed a slagging version in which the temperature at the bottom is sufficient for the ash to melt. This gasifier is referred to as the BGL (BG-Lurgi) gasifier. Several BGL gasifiers are currently being installed into plant for gasifying solid wastes and co-gasifying coal and waste.

## SPECIFIC GASIFIERS

Some of the most important and well-known gasification processes are described below in alphabetical order.

## BGL Gasifier (Moving Bed)

The BGL gasifier was originally developed in the 1970s to provide a syngas with a high methane content in order to provide an efficient means of manufacturing SNG from coal. It was developed over about 15 years at British Gas' Westfield Development Centre in Fife, initially to test the process for applicability to SNG manufacture and later for IGCC.

Lump coal and a flux such as limestone are fed into a lockhopper which periodically discharges into the top of the gasifier (Figure 1). A slowly rotating distributor plate distributes the coal evenly over the top of the bed. For caking coals, the distributor is connected to a stirrer which also keeps the bed even and prevents the coal from agglomerating. As the bed descends the gasifier, it undergoes a number of reactions. These reactions can be grouped into three zones at different heights in the fuel bed: in the upper zone coal is dried and devolatilises; in the middle zone it is gasified, and in the lower zone it is combusted, the  $CO_2$  produced acting as a gasification agent in the middle section.  $O_2$  and steam are added at the bottom of the bed through nozzles (tuyeres). The molten slag produced forms a pool in the bottom of the gasifier and is periodically removed.

The gasifier vessel is refractory-lined to prevent excessive heat loss from the bed. The refractory does not experience high temperatures as it is insulated from the hottest part of the bed (at the tips of the tuyeres) by the coal bed itself.

The gas exiting the gasifier is at a temperature of 450-500°C and contains tars and oils produced by the devolatilisation of the coal, together with coal dust elutriated from the bed. This is removed by a quench vessel located at the gas exit. The gas is simultaneously cooled and cleaned by a water quench. The gas then passes to a further chain of exchangers that cool the gas to ambient temperature prior to being desulphurised. The tars and water removed from the gas pass to a separator, from which the tars and coal dust are recycled to the tuyeres of the gasifier (a portion may be added to the top of the gasifier to suppress the elutriation of coal dust).

The BGL gasifier has a very high cold gas efficiency, ie, compared with other gasifiers, a larger portion of the original caloric value (CV) of the coal appears as chemical energy in the gas as opposed to thermal energy. Thus, the BGL gasifier does not feature high-temperature heat exchangers as required by Shell and Texaco systems amongst others. The gasification plant and CCGT unit is therefore less closely coupled as the gas-cooling train is not intimately integrated into the steam turbine cycle. In a BGL system more of the power is generated by the gas turbine and less by the steam turbine than in an entrained flow system.

**Kentucky Resources Council, Inc.**  
**Frankfort, KY**  
**Page 31 of 74**

Fuel is preprocessed in a lockhopper and then stored in a day- or charge-bin before being fed by screw into the gasifier. The bottom part of the gasifier itself comprises a fluidized bed, the fluidizing medium being air or  $O_2$  and steam. Gas plus eliminated solids flow up the reactor, with further air/ $O_2$  and steam being added in this region to complete the gasification reactions. The crude syngas is then dedusted in a cyclone and cooled. The solids removed in the cyclone are returned to the gasifier base. Ash is removed from the base of the gasifier by means of an ash screw.

The temperature in the base of the gasifier is kept at about 800-900°C, this is controlled to ensure that the temperature does not exceed the ash softening point; the temperature in the fireboard above the bed itself can be significantly higher. The operating pressure can vary between 10bar (for syngas manufacture) and 25-30bar (for IGCC).

### Lurgi Dry Ash (Moving Bed)

The Lurgi dry-ash gasification process was developed by Lurgi GmbH in the early 1930s as a means of producing Town Gas. The first commercial plant was built in 1936. Until 1950, the process was mostly restricted to lignites, but in the 1950s Lurgi and Ruhrchemie collaborated to develop a process suitable for bituminous coals as well. Since then the Lurgi gasification process has been widely used worldwide for producing Town Gas and syngas for a variety of purposes (e.g.  $NH_3$ , methanol, liquid fuel production). In addition to plants supplied by Lurgi itself, Lurgi-type gasifiers have been built in Eastern Europe and the former Soviet Union.

The first ever GPP at Lunen in Germany, used the Lurgi system (initially, the gasifiers were air-blown). Other significant installations using the Lurgi system are the Great Plains SNG plant in North Dakota, USA, and the SASOL synfuels plant in South Africa.

The process itself is shown schematically in Figure 5.

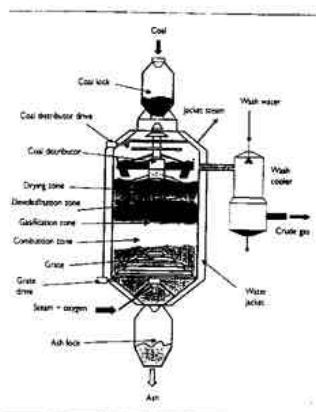


Figure 5. Lurgi dry-ash gasifier

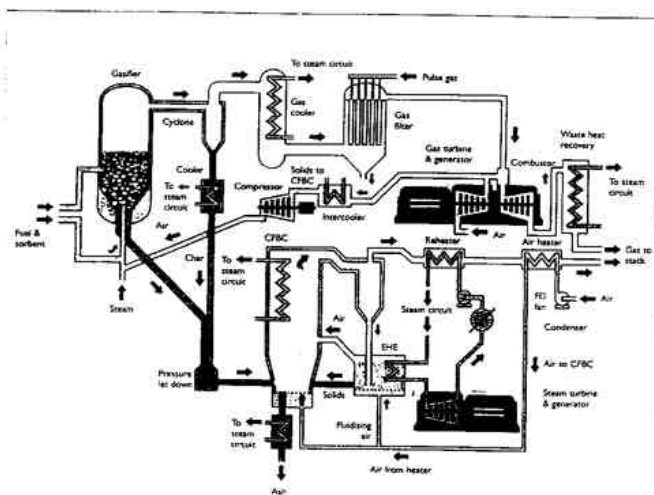


Figure 6. ABUS incorporating the Miller gasifier

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 32 of 74**Shell Coal Gasification Process (Entrained Flow)**

Shell's experience with gasification dates back to the 1950s, when the first SGP units were commissioned. In 1972, Shell started development work on a gasification process for coal. Following experience with a fixed pilot plant in Amsterdam, in 1978 Shell started operation of a 150tpd demonstration plant operated by Deutsche Shell at Hamburg near Hamburg, Germany. Shell used the experience gained to construct a plant at its existing petrochemicals complex at Deer Park in Houston, USA. This plant was sized to gasify 220tpd (250 US tons per day) of bituminous coal or 365tpd (400 US tons per day) of high-moisture, high-ash lignite. The Deer Park gasifier went into operation in 1987, and proved the ability of the SCGP to gasify a wide range of coals.

In 1989 it was announced that the SCGP had been chosen for an IGCC plant at Buggenum, the Netherlands; this remains the only commercial plant using the SCGP.

The Shell gasifier is shown in Figure 8.

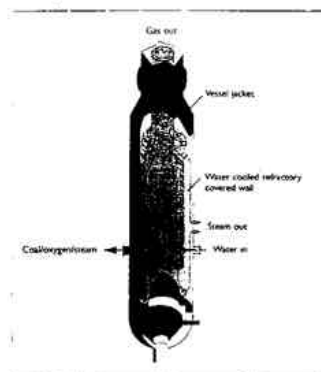


Figure 8 The Shell coal gasifier (courtesy of Shell)

The gasifier vessel consists of a carbon steel pressure shell, within which is a gasification chamber enclosed by a refractory-lined membrane wall. Water circulated through the membrane wall is used to control the temperature of the gasifier wall and remove saturated steam. Dried  $\text{H}_2$  and steam are fed through opposed burners at the bottom of the gasifier, which operates at ~25-30 bar. Gasification occurs at temperatures of 1500°C and above, which ensures that the ash in the coal melts and forms a molten slag. The slag runs down the inner surface of the gasifier wall and is quenched in a water bath at the bottom of the gasifier. A portion of the slag adheres to the wall of the gasifier and cools, forming a protective layer.

Gasification of the coal forms a raw fuel-gas that is predominantly  $\text{H}_2$  and  $\text{CO}$  with a little  $\text{CO}_2$  and some moisture. At the gasifier outlet, the raw-gas is quenched with recycled, cooled-fuel-gas to lower the temperature to ~900°C; this cooling 'freezes' the slag particles, rendering them less sticky and less prone to fouling surfaces.

The fuel-gas is then cooled to ~300°C in the syngas cooler, raising high- and medium-pressure steam. In contrast to the syngas cooler for Shell's oil gasification process, the SCGP syngas cooler has the gas on the shell side. The syngas cooler thus has a complex tube bundle (comprising various economisers, medium- and high-pressure evaporators and some superheaters).

The cooled syngas is filtered using ceramic filters. About 50% of the cooled syngas is then recycled to the top of the gasifier to act as the quenching medium for the gas. The remainder is washed to remove  $\text{H}_2\text{S}$  and  $\text{NH}_3$  and then passed to the desulphurisation unit.

**Texaco Gasification Process (Entrained Flow)**

The key feature of Texaco's process is the very wide range of feedstocks that have been successfully gasified using the same basic technology. This range encompasses gases, oils, Orimulsion™, petroleum coke and a range of coals. Texaco is additionally working on pre-treatment processes that will allow waste plastics and scrap tyres to be gasified.

The Texaco Gasification Process was originally developed in the late 1940s; the initial focus of the work was to develop a process for reforming natural gas so as to make synthesis gas for conversion into liquid hydrocarbons. Soon, the emphasis shifted to producing syngas for  $\text{NH}_3$  production. During the 1950s, work was carried out to extend the process to gasify oil and, to a lesser extent, coal. When the oil crisis occurred in 1973, work on coal gasification was re-commenced, and the first commercial plant gasifying coal began operation in 1983 at Lurgi's plant at Koppers, Tennessee, USA. In 1984 the Cool Water IGCC plant went into operation. Currently operational GPPs using the Texaco process are El Dorado (petroleum coke) and Polk (coal); the Texaco process has also been selected for the majority of oil-residue IGCCs being built or planned.

There are two basic variants of the process, which differ in the method used to cool the raw syngas. In the quench variant, the raw syngas from the bottom of the gasifier is shock-cooled with water. In the full heat recovery variant, the raw syngas is cooled using a syngas cooler. The Texaco quench gasifier is shown schematically in Figure 9 and the full heat recovery version in Figure 10.

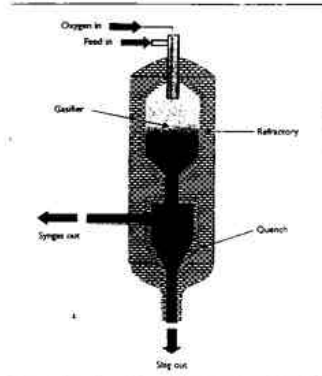


Figure 9 Texaco quench gasifier



Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 33 of 74CURRENT GASIFICATION  
POWER PLANT PROJECTS

There are currently at least 35 GPP projects in operation, commissioning, construction, design or planning. These vary in size from 500MW<sub>e</sub> to less than 10MW<sub>e</sub> and use a variety of fuels such as coal, heavy oil residues, waste woods, sewage sludge and sugar cane bagasse. A selection of these projects are reviewed below whilst a full list of operational and near-operational plant is given in Table 3.

## Coal GPPs

## Buggenum (Netherlands)

The Buggenum plant is the world's first commercial-sized (253MW<sub>e</sub>) coal-fired IGCC (Figure 11). The IGCC is based around a Shell SCGP gasifier and a CCGT supplied by Siemens. The plant was started up in 1993. As well as being the first of the current generation of IGCC plant, the project is important in that it contains a number of advanced design features. The most significant of these is that the ASU and the gas turbine

are very closely coupled together, with the gas turbine compressor supplying all the air to the ASU. This increases efficiency at the cost of making the plant more complex and less easy to start.



Figure 11 Buggenum IGCC (Courtesy of Deminor)

Name	Location	Output(MW <sub>e</sub> )	Fuel	Gasifier	Power Island	1998 Status	Year
Buggenum	Netherlands	253MW <sub>e</sub>	Bituminous coal	Shell	CCGT - V54.2	Operational	1995
Phon Pine	USA	100MW <sub>e</sub>	Bituminous coal	KRW	CCGT - GE 6FA	Commissioning	1998
Holk	USA	250MW <sub>e</sub>	Bituminous coal	Texaco	CCGT - GE 7F	Operational	1996
Puertollano	Spain	250MW <sub>e</sub>	Coal and petroleum coke	Pirella®	CCGT - V54.3	Commissioning	1998
Vaesov	Czech Republic	400MW <sub>e</sub>	Lignite	Lurgi	CCGT - 2xGE 9E	Operational	1995
Wabash River	USA	262MW <sub>e</sub>	Bituminous coal	Destec	CCGT - GE 7FA	Operational	1995
Si Dorado	USA	40MW <sub>e</sub> (gross)	Petroleum coke	Texaco	GT - GE 6B	Operational	1996
Falconara	Italy	234MW <sub>e</sub>	Vobreaker residues	Texaco	CCGT - ABB 13E2	Construction	1999
GSK	Japan	550MW <sub>e</sub>	Vacuum residue	Texaco	CCGT - 2xGE 9EC	Construction	2000
Pemis	Netherlands	125MW <sub>e</sub>	Refinery residues	Shell SGP	CCGT - 2xGE 6B	Operational	1997
Proko	Italy	521MW <sub>e</sub>	Refinery asphalt	Texaco	2xCCGT V54.2	Construction	1999
Gargallo	Italy	550MW <sub>e</sub>	Vobreaker residue	Texaco	CCGT - 3xGE 9E	Construction	2000
Star	USA	240MW <sub>e</sub>	Petroleum coke	Texaco	2xGE 6FA	Construction	1999
Amercentrale	Netherlands	85MW <sub>e</sub>	Wood wastes	Lurgi CFB	Existing boiler	Construction	2000
ARERE	UK	8MW <sub>e</sub>	SRC willow	TPS CFB	CCGT - AGT typhoon	Construction	1995
Energy Farm	Italy	12MW <sub>e</sub>	Short rotation forestry	Lurgi CFB	CCGT - Nuovo Pignone PGT106/1	Construction	2000
Lahti	Finland	70MW <sub>e</sub>	Wood wastes	Foster Wheeler CFB	Existing boiler	Operational	1998
McNeil	USA	~15MW <sub>e</sub>	Wood chips	Battelle CFB	Existing boiler	Operational	1997
Värnamo	Sweden	6MW <sub>e</sub>	Wood wastes	Foster Wheeler CFB	CCGT - AGT Typhoon	Operational	1993
Fondotoce	Italy	1MW <sub>e</sub>	MSW	Thermo-select (moving bed)	Gas motor generator	Operational	1994
Grube in Chianti	Italy	6.7MW <sub>e</sub> (gross)	Refuse - derived fuel	TPS CFB	Boiler and steam turbine	Operational	1992
New Bern	USA	<50MW <sub>e</sub>	Black liquor	Chemtec (entrained flow)	Boiler and steam turbine	Operational	1997
Schwarze Pumpe	Germany	60MW <sub>e</sub>	Assorted solid and liquid wastes	Noell, Lurgi BGL	CCGT - GE Frame 6	Operational. BGL to start-up in 1999	1997
Westfield	UK	120MW <sub>e</sub>	Sewage sludge plus coal	BGL	CCGT - GE 6B	GT Operational on natural gas	1998
Zellweg	Austria	10MW <sub>e</sub>	Biomass/wastes	AE&E CFB	Existing boiler	Operational	1997

Table 3 Operational and near-operational GPPs

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 34 of 74

#### Westfield (UK)

The site of British Gas' Westfield Development Centre in Fife is being developed by the US-based Fife Power. The existing BGL gasifiers on the site are being refurbished to gasify a mixture of coal and sewage sludge. When the plant is fully operational, it will generate ~120MW.

In a second project at the same site, Fife Power plans to build a 400MW unit, also using BGL gasifiers, to gasify coal and household refuse.

### FUTURE PROSPECTS

#### Market Opportunities

##### Coal

The most important markets for new coal-fired plants over the next 10-15 years will be China and South and East Asia. However, overwhelmingly in these markets, the technology chosen will be conventional oil-fired boilers, as the primary pre-requisites for these markets are low capital cost and high reliability, as well as the need to locally-source equipment wherever possible. The most important markets for IGCC will be North America (8-16GW) and China (5-8GW), the former driven by stringent emissions limits, the latter by the sheer amount of new capacity required. The uptake of IGCC in Europe will be constrained by the widespread availability of cheap natural gas. Overall, coal-fired IGCC will represent no more than 10% of new coal-fired plants worldwide until its costs are significantly lowered and its reliability increased.

##### Oil and Petroleum Coke

There is considerable scope in the short-to-medium term for oil- and petroleum coke-fired IGCCs plant integrated with refinery processes. The key drivers are the refiners' need to find routes for the disposal of heavy oil residues and petroleum coke and their need for H<sub>2</sub> to upgrade other refinery products. There is scope for up to 14GW<sub>e</sub> of oil-fired IGCC in the European Union (EU) by 2010 (based on the amount of heavy residue likely to be available). However, the actual oil-IGCC capacity in the EU will be constrained by the availability of natural gas, which is an alternative source of H<sub>2</sub>. Another significant market may be India, where the deployment of oil-IGCC will depend on being able to get reliable and secure power purchase agreements (PPAs). In the short-to-medium term, oil-IGCC plants may well outnumber coal IGCC plants.

##### Biomass

Biomass is becoming increasingly important as a fuel in both the EU and the USA because of concerns over CO<sub>2</sub> emissions. For biomass GPPs to make headway, they will have to become more cost-competitive relative to biomass combustion plants. Typical projects will be combined heat and power schemes utilising agricultural and forestry residues, eg in remote areas of Scandinavia, China, Canada, India and Brazil.

##### Waste

Gasification is an excellent, if expensive, way to dispose of wastes such as MSW and sewage sludge, both 'wet' and co-gasified with coal. It has several significant advantages over waste incineration, such as producing only an inert solid residue and eliminating the potential for the production of dioxins. Waste gasification will first 'take off' in those parts of Europe with particularly strong environmental concerns over waste incineration, such as Germany and Switzerland. By 2010, perhaps 15% of new waste disposal plants in Europe will be based on gasification.

A further application of the gasification of biomass and wastes is the production of fuel-gas for the partial repowering of existing oil- and coal-fired boilers. Several schemes are already in operation. Biomass and wastes cannot be used directly in conventional boilers. Their low or negative cost can make them attractive fuels in principle but they cannot be fired, as they cannot be ground finely enough. Air-blown gasification converts them into a fuel-gas that can be fired in the boiler, providing a means of waste disposal.

### Research and Development Needed

The current weaknesses of GPP technologies are high capital costs, poor reliability (at least for coal-fired IGCCs) and poor operational flexibility. The current strengths are high efficiency and environmental performance. It is therefore clear that, in the short-to-medium term, R&D effort needs to be focused on reducing costs and increasing reliability and operability. This R&D effort can be broken down into three major areas:

- i. research into the fundamentals of gasification
- ii. R&D to improve individual plant components
- iii. R&D into better overall process layout and design

Research into the fundamentals of gasification is required to establish the fuel flexibility of IGCC technologies. This would be directed at understanding gasification reaction rates and carbon conversion and at predicting the gasifiability of individual coals and other fuels, ashslag behaviour and the potential for sulphur capture in fluidised bed gasifiers.

R&D is required to improve the following components of IGCC, to make them more reliable and/or cheaper:

- gasifiers/syngas coolers
- pressurised coal feeding systems
- gas clean-up
- gas turbines
- ASUs.

The required R&D for gasifiers and syngas coolers is centred on the development of improved alloys and manufacturing processes to improve the corrosion resistance and lower the cost of these components.

Pressurised coal feeding systems (both dry-dip systems and briquetting systems) need to be improved to increase reliability and lower costs.

The development of improved hot gas clean-up systems could lower the cost of IGCC by providing a cheaper alternative to the conventional low-temperature processes currently employed. R&D is required to improve the reliability of both hot gas filters and hot gas desulphurisation systems.

The highest priority gas turbine R&D for IGCC is the development of better combustion systems for low-CV syngas. Also required is the development of more rugged gas turbines, capable of reliably running on uncleaned or partly-cleaned syngas.

Further work is required to allow the successful integration of ASUs into an IGCC. The two areas requiring attention are improved control systems for, and better dynamic simulation of, highly integrated ASUs. There is also the need, in the longer term, for alternatives to conventional cryogenic ASUs in order to lower costs.

A key area of R&D for IGCC is optimisation of the overall plant configuration and layout. Specific issues that require study are:

- dynamic simulation
- start-up and shut-down strategies
- operability
- simplified designs which reduce cost
- optimum integration strategies
- combining operability assessments within existing thermo-economic optimisation techniques

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 35 of 74**

**TAB 2**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 36 of 74

**PSC Request 2**

**Page 1 of 1**

**EAST KENTUCKY POWER COOPERATIVE, INC.**

**PSC CASE NO. 2000-079**

**INFORMATION REQUEST RESPONSE**

**PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00**

**REQUEST 2**

**RESPONSIBLE PERSON:** Dwight Lockwood

**COMPANY:** Kentucky Pioneer Energy

(responding for East Kentucky Power Cooperative)

**Request 2.** Provide a copy of the Tender Specification Documents ("TSD") of the construction contractor. Provide the design and engineering of the process if it is not included in the TSD. Were the characteristics of Kentucky-produced coal considered in the selection of the type of process and equipment?

**Response 2.** Kentucky Coal has qualities well suited for use by the Kentucky Pioneer Project. Kentucky Coal and other fuel components are included in all design work.

The PSD Permit Application to the Commonwealth of Kentucky, Department of Environmental Protection (DEP), and anticipated permit conditions, contain substantial design information for the project. Department of Air Quality (DAQ) within DEP is preparing a Draft Permit for public comment. Since the air permit is a prerequisite to project financing, there is ample opportunity to effectively reflect environmental requirements in the plant design.

Kentucky Pioneer Energy project design information is subject to international contractual secrecy agreements and is therefore business confidential and not available.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 37 of 74**

**TAB 3**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 38 of 74

PSC Request 3

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 3

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 3. Provide the estimated budget for the project.

Response 3. The direct costs associated with engineering, major equipment and construction of the project are estimated at \$470 million.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 39 of 74**

**TAB 4**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 40 of 74

PSC Request 4

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 4

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy

(responding for East Kentucky Power Cooperative)

Request 4. Provide the preliminary schedule for the project and estimated date of construction.

Response 4. Kentucky Pioneer Energy expects commercial operation after a 36-month engineering, procurement and construction period following financial closure in late 2000.



**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 41 of 74**

**TAB 5**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 42 of 74

PSC Request 5

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00  
REQUEST 5

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 5. Provide the ratio of the coal to solid waste.

Response 5. The AFT briquette Coal to RDF ratio can vary and will depend upon economic considerations, component qualities, and desired performance. Kentucky Pioneer Energy anticipates a ratio ranging from 2:1 to 1:1 RDF to Coal.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 43 of 74**

**TAB 6**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 44 of 74

PSC Request 6

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 6

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 6. Will the solid waste be combined with coal to produce a briquette or will the solid waste be converted into gas and then processed with the coal? Explain the process to be used.

Response 6. Typically the fuel briquette mixture of Kentucky Coal and RDF will be gasified, though a feed of coal is also feasible. Solid feed material will be gasified and the syngas will then be purified before use as combustion turbine fuel.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 45 of 74**

**TAB 7**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 46 of 74

PSC Request 7

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 7

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 7. Will Kentucky coal be used exclusively for the briquettes? If yes, describe the term of contracts that are expected to be signed.

Response 7. Kentucky Pioneer Energy intends to exclusively use Kentucky Coal. Long-term (i.e. 20 year) supply contracts are planned.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 47 of 74**

**TAB 8**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 48 of 74

PSC Request 8

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 8

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 8. How much coal and how much solid waste are anticipated to be utilized on an annual basis?

Response 8. Assuming a 50/50 blend of Kentucky Coal and RDF, annual consumption would approach:

Coal: 1 million tons per year

RDF (MSW): 1 million tons per year



**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 49 of 74**

**TAB 9**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 50 of 74

PSC Request 9

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 9

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 9. Where will the solid waste and coal be stored and where will the briquettes be made?

Response 9. The briquette production facility location has not yet been selected. Storage of solid waste components will be avoided by just-in-time delivery. Receipt of solid waste is planned to be indoors in a negative pressure building -- followed by immediate processing. Coal supplies will be staged sufficient to support briquette production upon receipt of MSW.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 51 of 74**

**TAB 10**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 52 of 74

PSC Request 10

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 10

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 10. Will all the solid waste originate in Kentucky or will out-of-state solid waste be imported?

Response 10. The relatively small amounts and generally widely dispersed nature of MSW in the Commonwealth (i.e. small quantities in each county) does not economically support exclusive utilization of Kentucky generated MSW supplies.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 53 of 74**

**TAB 11**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 54 of 74

PSC Request 11

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 11

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy

(responding for East Kentucky Power Cooperative)

Request 11. What is the range of specifications for the coal that can be used in this gasification process? What are the specifications of the coal that will be used in this process?

Response 11. A major benefit of BGL gasification technology is that it is capable of processing a wide range of feed materials, with wide-ranging specification. Also, syngas clean up (e.g. sulfur removal) enables use of high sulfur (non-compliance) coal. Acceptable coal content can be in excess of 7% sulfur and approximately 25% ash.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 55 of 74**

**TAB 12**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 56 of 74

PSC Request 12

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 12

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 12. Describe the type of purification system for the produced gas.

Response 12. Detailed design and final selection of the syngas purification system will occur in the early stages of engineering and construction after project financing. Major components of this system would typically include sulfur removal and recovery in excess of 99% as well as other conventional processing steps to prepare the syngas for use as a fuel.



**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 57 of 74**

**TAB 13**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 58 of 74

PSC Request 13

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 13

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 13. What is the estimated gas yield in Btu's gas per unit weight of coal and unit weight of solid waste?

Response 13. Syngas production is not normally measured relative to components, but rather of briquette feed. However, if one assumes a 50/50 blend of Coal/RDF the briquette will have a heating value (HHV) of approximately 10,000 Btu/lb of briquette feed. The BGL gasifier has a conversion efficiency of approximately 92%. Therefore, syngas yield will be approximately 9200 Btu/lb of briquette feed.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 59 of 74**

**TAB 14**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 60 of 74

PSC Request 14

Page 1 of 1

**EAST KENTUCKY POWER COOPERATIVE, INC.**  
**PSC CASE NO. 2000-079**  
**INFORMATION REQUEST RESPONSE**

**PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00**

**REQUEST 14**

**RESPONSIBLE PERSON:** Dwight Lockwood

**COMPANY:** Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

**Request 14.** What is the estimated annual operating cost of the plant?

**Response 14.** Annual Operating Expenses for fuel and other consumables will be governed by final contracts for those materials. Specific Operating Expenses for the Integrated Gasification Combined Cycle (IGCC) facility are business confidential and therefore not available.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 61 of 74**

**TAB 15**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 62 of 74

PSC Request 15

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 15

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 15. Explain the type of process that will be used for coal gasification.

Response 15. BGL gasification is oxygen blown, fixed bed slagging technology operating at approximately 350 psig. Each of the four planned refractory lined reactors have an internal diameter of 12 feet, are water jacket cooled and have reaction zone temperatures at a nominal 3200°F. Briquettes are fed through a lock-hopper at the top and descend by gravity in countercurrent flow to the rising syngas. The syngas, therefore, causes the vaporization of moisture and volatilization of light hydrocarbons from the briquettes. Instead of ash going to landfill disposal from a conventional coal power plant, the ash content of fuel briquettes is produced as solid inert vitrified frit from the bottom of the gasifier through a quench and lock-hopper. Vitrified frit, also known as synthetic aggregate, is inert, non-leaching and viable for sale as road paving material.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 63 of 74**

**TAB 16**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 64 of 74

PSC Request 16

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 16

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 16. Provide the operating manual, if available.

Response 16. An operating manual for the plant, consisting of a library of volumes, will be developed after detailed design and during construction.



**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 65 of 74**

\* \* \*

**TAB 17**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 66 of 74

PSC Request 17

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 17

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 17. What is the gasification media (e.g., air, oxygen, steam)?

Response 17. Gasification media consists of oxygen and steam.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 67 of 74**

**TAB 18**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 68 of 74

PSC Request 18

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 18

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 18. What is the estimated cost of the synthetic gas per million Btu?

Response 18. Kentucky Pioneer Energy intends to deliver synthesis gas to the combustion turbines at a unit cost lower than natural gas.

**Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 69 of 74**

**TAB 19**

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 70 of 74

PSC Request 19

Page 1 of 1

EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2000-079

INFORMATION REQUEST RESPONSE

PUBLIC SERVICE COMMISSION REQUEST DATED 6/1/00

REQUEST 19

RESPONSIBLE PERSON: Dwight Lockwood

COMPANY: Kentucky Pioneer Energy  
(responding for East Kentucky Power Cooperative)

Request 19. If the proposed combustion turbine is operated exclusively on natural gas, what is the maximum gas consumption per hour and what is the maximum quantity of gas per hour available at the site for this combustion turbine?

Response 19. The combustion turbines will normally be operated at base load. Heat input of each combustion turbine is approximately 1700 million Btu/hour. Five interstate pipelines are in the general vicinity of the project site, with at least one crossing the property. Adequate supplies are seen to be available.

Kentucky Resources Council, Inc.  
Frankfort, KY  
Page 71 of 74

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF EAST KENTUCKY POWER )  
COOPERATIVE, INC. FOR A CERTIFICATE OF PUBLIC )  
CONVENIENCE AND NECESSITY, AND A CERTIFICATE )  
OF ENVIRONMENTAL COMPATIBILITY, FOR THE )  
CONSTRUCTION OF A 250 MW COAL-FIRED )  
GENERATING UNIT (WITH A CIRCULATING FLUID BED ) CASE NO.  
BOILER) AT THE HUGH L. SPURLOCK POWER STATION ) 2001-053  
AND RELATED TRANSMISSION FACILITIES, LOCATED IN )  
MASON COUNTY, KENTUCKY, TO BE CONSTRUCTED )  
ONLY IN THE EVENT THAT THE KENTUCKY PIONEER )  
ENERGY POWER PURCHASE AGREEMENT IS )  
TERMINATED )

ORDER

East Kentucky Power Cooperative, Inc. ("East Kentucky") filed its application on March 9, 2001 for a Certificate of Public Convenience and Necessity and a Certificate of Environmental Compatibility to construct a 250 MW coal-fired generating unit, referred to as "Gilbert," at the Hugh L. Spurlock power station ("Spurlock") and related transmission facilities in Mason County, Kentucky. The Gilbert unit was to be constructed only in the event that East Kentucky's prior agreement to purchase the output of a 540 MW generating unit proposed by the Kentucky Pioneer Energy, L.L.C. ("KPE") is terminated. The Attorney General's Office ("AG") and the Kentucky Natural Resources and Environmental Protection Cabinet, Department of Natural Resources, Division of Energy ("DOE") were granted intervention and a hearing was held on August 18, 2001.

**Kentucky Resources Council, Inc.**  
**Frankfort, KY**  
**Page 72 of 74**

On July 11, 2001, East Kentucky amended its application to eliminate the contingent nature of its request because KPE had not met its financial closing deadline of June 30, 2001. The amended application also revised Gilbert's output from 250 MW to 268 MW. East Kentucky has not terminated the power purchase agreement because the power will be sold at a very reasonable price and KPE has indicated that it believes it can obtain project financing by March 2002. However, due to the delay in KPE's financing, East Kentucky decided that it cannot reasonably rely on that project to satisfy its future power supply needs. Therefore, East Kentucky has concluded that it should proceed to build the Gilbert unit. In the event that KPE is able to secure project financing, East Kentucky stated that certain provisions in the existing purchase power agreement would have to be revised and any renegotiated contract will be resubmitted to the Commission for its prior approval.

East Kentucky submitted to the Natural Resources and Environmental Protection Cabinet ("Natural Resources Cabinet") a statement of environmental compatibility for the proposed Gilbert unit. By letter dated May 23, 2001, the Natural Resources Cabinet reported that East Kentucky's proposed Gilbert plant will be environmentally compatible.

East Kentucky determined that additional power will be needed to meet its future load requirements and it issued a request for proposal to utilities and power marketers on January 11, 2001. Several responses were received, but East Kentucky's analysis shows that the proposed Gilbert unit will have the lowest cost. Additional analyses were performed in response to the request of the AG. One of those analyses shows that adding one 93 MW combined cycle unit in April 2004 and waiting for the KPE project to develop will cost \$114 million less than adding the Gilbert unit now and then relying on



**Kentucky Resources Council, Inc.**  
**Frankfort, KY**  
**Page 73 of 74**

the KPE development. East Kentucky rejected this scenario, claiming that it should not place all of its new base load requirements at market risk, contingent on the development of the KPE project as a commercially viable plant.

The AG recommends that East Kentucky's request to construct the Gilbert unit be granted. However, if KPE achieves financial closure by the summer of 2002, the AG suggests that the Commission and the parties explore cancellation of the Gilbert unit. DOE recommends that East Kentucky should complete a full and comprehensive study of the technical potential of demand-side resources and distributed generation in its service territory before proceeding to construct any new generation.

Based on East Kentucky's supply analyses, the uncertainty of the KPE project, and East Kentucky's need for additional power, the Commission finds that the construction of the Gilbert unit should be approved. Further, the Commission finds that when the KPE project achieves financial closure, East Kentucky should refile the power purchase agreement for review and approval by the Commission. The filing should include an analysis of the feasibility of the cancellation of the Gilbert unit and the substitution of a 93 MW combined cycle unit. In addition, the Commission finds that East Kentucky should continue to review the feasibility of demand side resources and provide a detailed analysis of its review in future filings related to generating capacity.

The Gilbert unit has the ability to burn not only coal but also wood waste and other biomass products due to the nature of a circulating fluid bed boiler. East Kentucky did not propose to include as part of the initial construction the handling facilities necessary to burn any of these other products. The AG recommended that the wood waste handling facilities be included in the unit design and that wood waste be

**Kentucky Resources Council, Inc.**  
**Frankfort, KY**  
**Page 74 of 74**

considered as one of the primary fuels. East Kentucky acknowledged that the wood waste handling facilities would cost \$2.5 to \$3 million and have a relatively short payback. Due to the potential cost savings over time from burning biomass, the Commission finds that East Kentucky should conduct a detailed analysis of fueling the Gilbert unit with wood waste and other biomass products.

East Kentucky indicated that additional transmission facilities would be needed to maintain stability of the unit at the Spurlock station. A transmission line will be needed to connect to transmission facilities owned by Cinergy Corp. East Kentucky indicated that certain agreements are necessary between the utilities, and additional time will be needed to finalize those agreements. Because of the potential delay in finalizing the transmission agreements, East Kentucky proposed to delete the transmission portion of its application and proceed only with the proposed generating facilities. The Commission finds East Kentucky's proposal to be reasonable.

IT IS THEREFORE ORDERED that:

1. East Kentucky is granted a Certificate of Public Convenience and Necessity and a Certificate of Environmental Compatibility to construct the Gilbert unit, a 268 MW coal-fired generating unit with a circulating fluid bed boiler, at the Spurlock station at an estimated cost of \$367 million.
2. East Kentucky shall conduct a detailed analysis of the benefits of fueling with wood waste and other biomass products and file that analysis upon completion.
3. East Kentucky's request to delete from consideration at this time the construction of needed transmission facilities is granted. Within 30 days of completing all analyses, including the selection of a final route for the transmission facilities and the

**Kentucky Department of Fish and Wildlife Resources**  
**Frankfort, KY**  
**Page 1 of 2**

FISH & WILDLIFE COMMISSION  
Mike Boatwright, Paducah  
Tom Baker, Bowling Green, Chairman  
Allen K. Gailor, Louisville  
Charles E. Bale, Hodgenville  
Dr. James R. Rich, Taylor Mill  
Ben Frank Brown, Richmond  
Doug Hensley, Hazard  
Dr. Robert C. Webb, Grayson  
David H. Godby, Somerset



COMMONWEALTH OF KENTUCKY  
DEPARTMENT OF FISH AND WILDLIFE RESOURCES  
C. THOMAS BENNETT, COMMISSIONER



November 30, 2001

Mr. Alex Barber  
Commissioner's Office  
Department for Environmental Protection  
14 Reilly Road  
Frankfort, KY 40601

RE: Project No. SERO2001-101, Kentucky  
Pioneer Integrated Gasification Combined Cycle  
(IGCC) Demonstration Project, Draft  
Environmental Impact Statement (DEIS)  
(DOE/EIS-0318), Clark County, Kentucky.

Dear Mr. Barber:

Members of my staff have reviewed the above-referenced DEIS. Accordingly, we offer the following comments and recommendations.

While the DEIS covers most of the areas of potential impact, there are several areas where the Kentucky Department of Fish and Wildlife Resources (KDFWR) feels the document is deficient. Those areas are:

- 1) There is no discussion regarding impingement and/or entrainment of aquatic resources. Such losses can have significant impacts on local aquatic resources depending upon the design of water intakes. KDFWR recommends that such studies be undertaken to determine the significance of such losses.
- 2) The report does acknowledge the possible presence of freshwater mussels and that a thermal plume will result from the discharge of water used in the power generation process. However, there is no discussion if the thermal plume will have any impacts on non-motile aquatic organisms such as freshwater mussels. Data from the Ohio River suggests that thermal plumes from power generation stations are one of the primary reasons for the decline of the mussel resource in that body of water. KDFWR recommends that an evaluation of the thermal plume impact on non-motile aquatic species be conducted.

Members of my staff will be available to discuss our comments with you or anyone in your agency. The point of contact with KDFWR will be Wayne L. Davis, Environmental Section Chief (502/564-7109).



Arnold L. Mitchell Bldg. #1 Game Farm Road Frankfort, Ky 40601  
An Equal Opportunity Employer M/F/D

**Comment No. 1****Issue Code: 08**

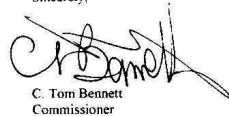
National Pollution Discharge Elimination System (NPDES) regulations found in Title 40 Part 125 of the *Code of Federal Regulations* (CFR) address cooling water intake structures for new facilities. The final rule was published on December 18, 2001, and implemented in Section 316(b) of the *Clean Water Act* for new facilities that use water withdrawn from rivers and streams and other waters of the United States for cooling purposes (EPA 2001). The regulations establish national technology-based performance requirements applicable to the location, design, construction, and capacity of cooling water intake structures at new facilities. The purpose of the regulations are to reduce impingement and entrainment of aquatic organisms and preserve the ecosystems they inhabit. The regulations apply to new and stand-alone facilities that use cooling water intake structures with designed intake flows of greater than 7.6 MLD (2 MGD) and that use at least 25 percent of water withdrawn for cooling purposes. If a new facility has or requires an NPDES permit but does not meet the 7.6 MLD (2 MGD) intake flow threshold or uses less than 25 percent of its water for cooling water purposes, the permit authority will implement Section 316(b) on a case-by-case basis, using the best professional judgment. An example of a new facility is a facility constructed on the same property as an existing facility, but is a separate and independent industrial operation. The Kentucky Pioneer IGCC Demonstration Project meets the definition of a new facility. Currently, it is projected that the facility would withdraw a total of 15.2 MLD (4 MGD) of surface water for turbine condenser cooling and process and cooling water makeup. Thus, 40 CFR 125 regulations would apply. Compliance with the regulations in the design, construction, and capacity of cooling water intake structures will minimize adverse environmental impacts to aquatic organisms and their ecosystems.

Kentucky Department of Fish and Wildlife Resources  
Frankfort, KY  
Page 2 of 2

Page Two  
Mr. Barber  
November 30, 2001

We appreciate the opportunity to comment.

Sincerely,



C. Tom Bennett  
Commissioner

CTB/WLD/kh

cc: Edwin F. Crowell, Asst. Director, Division of Fisheries  
Lewis E. Kornman, Northeastern Fishery District Biologist  
Lee A. Barclay, USFWS, Cookeville, TN  
Environmental Section Files

**Comment No. 2**

**Issue Code: 08**

The Kentucky Natural Resources and Environmental Protection Cabinet has established regulatory limits relative to the Kentucky River, which explicitly provide a mechanism to establish thermal impact parameters. Kentucky regulations (401 Kentucky Administration Regulations [KAR] 5:031) contain specific, seasonal (generally month to month) temperature limits which permitted effluent limits are based. Project-specific information will not be available until an application for a KPDES permit is submitted approximately 1 year (minimum time is 180 days) before plant operation begins. However, effluent temperature will be limited and established to avoid impacting the monthly Kentucky River receiving stream limits. Use of the bounding analysis in Section 5.9, Ecological Resources, of the EIS, indicates that benthic organisms most likely to be affected would be in close proximity to the discharge port. Mortality of benthic organisms may occur along with a potential shift in species' populations or lack of recolonization of the affected area. A statement to this effect has been added to Section 5.9, Ecological Resources. Conditions set by the KPDES permit will be followed, including any recommendations for further evaluation.

Kentucky Natural Resources and Environmental Protection Cabinet  
Frankfort, KY  
Page 1 of 2

JAMES E. BICKFORD  
SECRETARY



PAUL E. PATTON  
GOVERNOR

COMMONWEALTH OF KENTUCKY  
**NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET**  
DEPARTMENT FOR ENVIRONMENTAL PROTECTION  
FRANKFORT OFFICE PARK  
14 REILLY RD.  
FRANKFORT KY 40601

February 11, 2002

**Comment No. 1**  
Comment noted.

**Issue Code:21**

Roy Spears  
National Energy Technology Laboratory  
U S Department of Energy  
P O Box 880  
3610 Collins Ferry Road  
Morgantown, WV 26507-0880

Re: Kentucky Pioneer Integrated Gasification Combined Cycle (IGCC) Demonstration Project Draft  
Environmental Impact Statement (DEIS) (DOE/EIS-0318) in Clark County (SERO 2001-101)

Dear Mr. Spears:

The Natural Resources and Environmental Protection Cabinet (NREPC) serves as the state clearinghouse for review of environmental documents generated pursuant to the National Environmental Policy Act (NEPA). Within the Cabinet, the Commissioner's Office in the Department for Environmental Protection **coordinates** the review for Kentucky State Agencies.

The Kentucky agencies listed on the attached sheet have been provided an opportunity to review the above referenced report. Responses were received from 9 (also marked on attached sheet) of the agencies that were forwarded a copy of the document. Attached are comments from the Kentucky Divisions of Water and Waste Management, and the Kentucky Department of Fish and Wildlife Resources.

1/21

If you should have any questions, please contact me at (502) 564-2150, ext. 112.

Sincerely,

Alex Barber  
State Environmental Review officer

Enclosure



**Kentucky Natural Resources and Environmental Protection Cabinet**  
**Frankfort, KY**  
**Page 2 of 2****NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION  
CABINET****ENVIRONMENTAL REVIEW**

Kentucky Pioneer Integrated Gasification Combined Cycle (IGCC) Demonstration Project Draft  
Environmental Impact Statement (DEIS) (DOE/EIS-0318) in Clark County

The following agencies were asked to review the above referenced project. Each agency that returned a response will appear below with their comments and the date the project response was returned.

**C denotes Comments**  
**NC denotes No Comment**  
**IR denotes Information Request**  
**NR denotes No Response**

**REVIEWING AGENCIES:**

Division of Water	_____	comments
Division of Waste Management	_____	comments
Division for Air Quality	_____	nc
Department of Health Services	_____	
Economic Development Cabinet	_____	
Division of Forestry	_____	
Department of Surface Mining Reclamation & Enforcement	_____	nc
Department of Parks	_____	nc
Department of Agriculture	_____	
Nature Preserves Commission	_____	nc
Kentucky Heritage Council	_____	nc
Division of Conservation	_____	
Department for Natural Resources	_____	ns
Department of Fish & Wildlife Resources	_____	comments
Transportation Cabinet	_____	ns
Department for Military Affairs	_____	nc

1/21  
(cont.)

**Kentucky Natural Resources and Environmental Protection Cabinet, Division of Waste Management  
Frankfort, KY  
Page 1 of 1**JAMES E. BICKFORD  
SECRETARYPAUL E. PATTON  
GOVERNORCOMMONWEALTH OF KENTUCKY  
**NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET**  
DEPARTMENT FOR ENVIRONMENTAL PROTECTION  
FRANKFORT OFFICE PARK  
14 REILLY RD  
FRANKFORT KY 40601

December 18, 2001

Division of Waste Management

Comments for Project #SER02001-101

Any hazardous waste generated must be handled according to the regulations. Global cannot presume the facility will be conditionally exempt until actual amounts of waste are generated.

Global needs to consider an on-site solid waste landfill in case the frit recycling market does not exist. In Waste Section – 500 to 700 tons per day would exceed small quantity limits if hazardous.

The Division of Waste Management would be concerned that all solid and/or hazardous waste generated by this project be disposed at a permitted facility.

Another concern is that during this type of project, old regulated and non-regulated underground storage tanks may be encountered, as well as other contamination. Should tanks or contamination be encountered they must be properly reported and remediated.

Printed on Recycled Paper  
An Equal Opportunity Employer M/F/D**Comment No. 1****Issue Code: 12**

Comment noted. KPE waste management activities will be in accordance with RCRA and applicable state regulations.

**Comment No. 2****Issue Code: 12**

Comment noted. Analysis of the frit from other gasification processes has found that it is nonhazardous and rarely fails the TCLP for metals. The frit generated by the proposed project is expected to pass the more stringent Universal Treatment Systems criteria of EPA-TCLP analytical method. If any of the frit could not be sold, it would be stored temporarily in covered rail cars and be disposed of at a licensed industrial solid waste landfill in the State of Kentucky, as discussed in Section 5.13, Waste Management.

1/12

**Comment No. 3****Issue Code: 12**

KPE waste management activities will be in accordance with RCRA and applicable state regulations. All waste generated onsite would be disposed of at licensed waste disposal facilities, as discussed in Section 5.13, Waste Management.

2/12

3/12

4/12

**Comment No. 4****Issue Code: 12**

As noted in Section 4.2, Land Use, the project area will consist of a 121-hectare (300-acre) tract of land previously distributed during site preparation for the abandoned construction of the J.K. Smith plant by EKPC. Therefore, because of this grading, KPE does not anticipate encountering any underground storage tanks or other contamination. In the event of encountering an unregulated storage tank or the occurrence of a reportable quantity spill, KPE would notify the KDEP and local emergency response units as well as the general public.

Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water  
Frankfort, KY  
Page 1 of 2JAMES E. BICKFORD  
SecretaryPAUL E. PATTON  
GovernorCOMMONWEALTH OF KENTUCKY  
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET  
DEPARTMENT FOR ENVIRONMENTAL PROTECTION  
FRANKFORT OFFICE PARK  
14 RELLY RD.  
FRANKFORT, KY 40601

## MEMORANDUM

**TO:** Alex Barber  
State Environmental Review Officer  
Department for Environmental Protection

**FROM:** Timothy Kuryla *TK*  
EIS Coordinator  
Division of Water

**DATE:** February 8, 2002

**SUBJECT:** DEIS, Gas Electric Demonstration Generator Near Bloomingdale (Clark County),  
SERO 011113-101

The Division of Water has reviewed this Draft Environmental Impact Statement, prepared by the National Energy Technology Laboratory (NETL) regarding a gas electric demonstration generator at the J. K. Smith power plant located near Bloomingdale (Clark County). The J. K. Smith facility is owned by the East Kentucky Power Cooperative (EKPC).

The Division of Water emphasizes that the NETL document is not a Statement of Environmental Compatibility (SEC) from the Public Service Commission (PSC).

The Division of Water comments address matters the Division desires considered in the Final EIS.

WATER QUALITY  
Wetlands

4 **AFFECTED ENVIRONMENT**  
4.8 **Water Resources & Water Quality**  
4.8.4 **Wetlands**

Page 4-31

If the project can result in a discharge of dredge or fill material into:

- 200 linear feet of any "blue line" stream (as shown on the U.S. Geological Survey 7.5 minute topographical map for the project area), or

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## Comment No. 1

Issue Code: 21

Comment noted. Once design is complete, KPE will seek a Statement of Environmental Compatability from the Public Service Commission.

## Comment No. 2

Issue Code: 07

It is not currently anticipated that the project would result in a discharge of dredge or fill material into "navigable waters of the United States." However, if KPE determines in the more advanced stages of plant design that such a discharge could occur, a Section 401 water quality certification and Section 404 permit would be obtained from the U.S. Army Corps of Engineers (USACE).

We concur with the recommendation that native flora should be used for erosion control revegetation.

1/21

2/07



**Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water  
Frankfort, KY  
Page 2 of 2**SERO 011113-101  
Page 2

- One acre or more of any wetland.

then a 33 USC § 1341 ("401") water quality certification by the Division of Water for the U.S. Army Corps of Engineers and a 33 USC § 1344 ("404") dredge or fill permit must be obtained. The DEIS states that there are no wetlands on the proposed gas electric generator site.

The Division of Water recommends that erosion control revegetation consist of native flora. Using native vegetation will reduce erosion and benefit wildlife.

**Water Withdrawal**

4	<b>AFFECTED ENVIRONMENT</b>	
4.8	<b><u>Water Resources &amp; Water Quality</u></b>	
4.8.5	<b>Water Use</b>	Page 4-31
5	<b>ENVIRONMENTAL IMPACTS</b>	
5.8	<b><u>Water Resources &amp; Water Quality</u></b>	
5.8.4	<b>Water Resources Impacts from the Proposed Action</b>	Pages 5-24 & 5-25

The existing EKPC intake is located in the Kentucky River, at River Mile (RM) 187.4; the discharge is at approximately RM 187.35. These sites are behind the pool formed by Lock and Dam 10 located at RM 176.4.

The EKPC is exempt, under law, for a water withdrawal permit for the steam electric generators. However, for the FEIS, the discussions in 4.8.5 and 5.8.4 need to be expanded to discuss the constraints on water use in the Kentucky River during low flows. The Division of Water observes that the Kentucky River is already stressed during low flows. What additional impact would the proposed project have? The impact on the Kentucky River of the temperature of discharge flows also needs to be addressed in the FEIS.

**FLOODPLAIN CONSTRUCTION**

4	<b>AFFECTED ENVIRONMENT</b>	
4.8	<b><u>Water Resources &amp; Water Quality</u></b>	
4.8.3	<b>Floodplains</b>	Page 4-31
5	<b>ENVIRONMENTAL IMPACTS</b>	
5.8	<b><u>Water Resources &amp; Water Quality</u></b>	
5.8.4	<b>Water Resources Impacts from the Proposed Action</b>	Pages 5-24 & 5-25

In 4.8.3 (page 4-31) and in 5.8.3 (pages 5-24 & 5-25), the DEIS states that the existing intake and discharge are not considered in the floodplain. True, these structures are located in the Kentucky River. However, floodplain construction includes the channel as well as adjacent land. Work on either the intake or the discharge will require a floodplain construction permit.

cc: Leon Smothers, Water Quantity Branch

**Comment No. 3****Issue Code: 07**2/07  
(cont.)

Sections 4.8 and 5.8, Water Resources and Water Quality, have been expanded to include information on constraints on water use in the Kentucky River during low flows. Although EKPC is exempt from obtaining a water withdrawal permit from the state, KPE has indicated that they would work with state authorities during low-flow conditions and would cease plant operations if required.

**Comment No. 4****Issue Code: 08**

3/07

The Kentucky Natural Resources and Environmental Protection Cabinet has established regulatory limits relative to the Kentucky River, which explicitly provide them with a mechanism to establish thermal impact parameters. Kentucky regulations (401 KAR 5:031) contain specific, seasonal (generally month to month) temperature limits on which permitted effluent limits are based. The impacts analysis contained in Section 5.9, Ecological Resources, of the EIS addresses the potential impacts from a thermal plume. Project-specific information will not be available until an application for a KPDES permit is submitted approximately 1 year (minimum time is 180 days) before construction begins. This will occur after the project is financed and the plant designed. However, effluent temperature will be limited, and will be established to avoid impacting the monthly Kentucky River receiving stream limits. Should low flow or drought conditions require the cessation of water withdrawal from the Kentucky River, an event that has not yet occurred, the plant would be shut down for that period of time. A statement to this effect has been added to Section 5.9, Ecological Resources, of the Final EIS.

4/08

5/07

**Comment No. 5****Issue Code: 07**

Comment noted. The text of the EIS has been revised accordingly.

Littrell, Maxine  
Lexington, KY  
Page 1 of 1



Kentucky Pioneer Integrated Gasification  
Combined Cycle Demonstration Project  
Draft Environmental Impact Statement  
U.S. Department of Energy  
National Energy Technology Laboratory

**Written Comment Form**

Must be received by January 4, 2002.

I am very unhappy with the Federal  
government's idea of spending \$70,000,000  
of our tax dollars for an experimental  
plant at Trepp, Kentucky that will  
use high-sulphur coal and refined  
garbage as a fuel source.

1/16

We should be exploring ways to  
take care of our Mother Earth and  
the environment. The people of Kentucky  
do not need to be guinea pigs for a  
useless experiment.

2/22

Please use your influence to stop  
this project.

Please use other side if more space is needed.

Comment forms may be mailed to:  
Mr. Roy Spears  
U.S. Department of Energy  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Morgantown, WV 26507-0880

Comment forms may be faxed to:  
Mr. Roy Spears  
(304) 285-4403

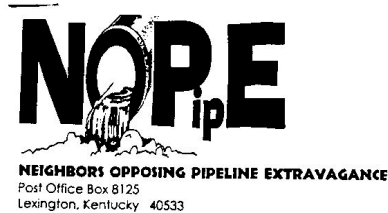
Maxine Littrell  
4800 Breadwin Way  
Lexington, Ky 40514

Comment No. 1  
Comment noted.

Issue Code: 16

Comment No. 2  
Comment noted.

Issue Code: 22

Neighbors Opposing Pipeline Extravagance  
Lexington, KY  
Page 1 of 2

Dec 18, 2001

Mr. Roy Spears  
US Department of Energy  
3610 Collins Ferry Rd.  
PO Box 880  
Morgantown, WV 26507-0880

Dear Mr. Spears,

I am writing in regard to the draft EIS for the proposed Global Energy Power Plant located at Trapp, Kentucky to be operated by Kentucky Pioneer Energy.

Neighbors Opposing Pipeline Extravagance (NOPE) is a grassroots citizens group formed in 1999 to oppose the construction of a water supply pipeline from the Ohio River at Louisville to Lexington, which as you know is located approximately 20 miles downstream of Trapp on the Kentucky River. Lexington draws its water supply from this small river. The proposed pipeline, a \$100 million ratepayer-financed project which is sought by the privately-owned Kentucky American Water Company, is intended to be a backup water supply source during a drought. The Kentucky Attorney General's office, the Lexington-Fayette Urban County Government and many Bluegrass citizens have opposed this pipeline project as too costly and unnecessary.

During the severe drought of 1999, the Kentucky River water supply was extremely limited. In September of that year, water stopped flowing over the dams on the Kentucky River, and mandatory water conservation was imposed on Lexington residents. Experts have predicted that in the event of a more severe 100-year drought, with the projected population expansion of the region, the Kentucky River will be unable to meet the water supply needs of Kentucky-American's customers by the year 2020. NOPE takes the position that water conservation and improvements to the Kentucky River's system of locks and dams would be sufficient to get us through a drought, but we are alarmed at the projected 3.6 million gallons per day of water that would be drawn from the Kentucky River by the proposed Trapp power plant.

1/07

**Comment No. 1****Issue Code: 07**

The cumulative effects of withdrawals from the Kentucky River by power plants have been discussed by the Kentucky Natural Resources and Environmental Protection Cabinet in their cumulative assessment report (KNREPC 2001), addressed in Section 5.14, Cumulative Impacts. The Cabinet acknowledges that because many of Kentucky's power plants are exempt from water withdrawal requirements, the Cabinet does not have an accurate inventory of the volume of water being removed each day by the existing power plants. However, the KDEP has the authority to limit withdrawals from permitted sources during periods of abnormally low flow. Although the proposed plant would not be a permitted withdrawal source, KPE has stated that they would cease water withdrawals if requested by the state. Section 5.8, Water Resources and Water Quality, has been revised to address this issue.

Because of the lock and dam system on the Kentucky River in the project area, the withdrawals from the power plant located on the North Fork of the Kentucky River would be isolated from the area of the river in the proposed project area.

**Comment No. 2****Issue Code: 22**

Comment noted.

**Comment No. 3****Issue Code: 20**

The recently permitted Enviropower Power Plant is located on the North Fork of the Kentucky River upstream from the confluence with the South Fork that creates the Kentucky River. As discussed in Section 4.8, Water Resources and Water Quality, the Kentucky River is a series of pools created by 14 locks and dams composing the navigation system maintained and operated by the USACE. The proposed Kentucky Pioneer IGCC Demonstration Project would be

**Neighbors Opposing Pipeline Extravagance**  
**Lexington, KY**  
**Page 2 of 2**

In a severe drought, we simply do not have this water available. I would refer you to the Kentucky Division of Water for more information on this issue.

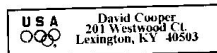
The end result of building a power plant at Trapp may be an additional \$100 million dollars burden on the people of Central Kentucky, a burden which is not recognized in your draft EIS.

I submit to you that the citizens of Central Kentucky are being asked to bear all of the costs of this proposal, yet receive few if any benefits.

I request that the Department of Energy consider the water withdrawal impacts of this proposal on the Kentucky River. I would also point out that the recently permitted Enviropower power plant located on the North Fork of the Kentucky River in Knott County, will also draw enormous quantities of water from the North Fork of the Kentucky River. It is possible that these two power plants will remove so much water from the Kentucky River that Lexington would be unable to survive even a 1999-type drought.

Sincerely,

  
David S. Cooper  
President, NOPE

**Comment No. 3 (cont.)****Issue Code: 20**

located upstream of Lock 10. There are four additional locks upstream from the project site to the confluence of the North and South Forks of the Kentucky River.

2/22

1/07  
(cont.)

3/20

The flow of the river is regulated by each lock and dam structure. Since there are four lock and dam structures between the two proposed plants, any withdrawals from the North Fork of the Kentucky River and resulting impacts to the flow rates would be mitigated by the time the river flow reached the area above Lock 10. As discussed in Section 5.14, Cumulative Impacts, the proposed Kentucky Pioneer IGCC Demonstration Project would withdraw 15.2 MLD (4 MGD) from the Kentucky River on a continual basis. The cumulative withdrawal from the Kentucky Pioneer facilities and all seven existing and reasonably foreseeable CTs at the J.K. Smith Site operating at full capacity would be 19.2 MLD (5 MGD) of operation. The cumulative withdrawal of all facilities operating full time at the J.K. Smith Site would be less than 0.15 percent of the average flow of the Kentucky River and would have little impact on water levels within the river itself.

Parker, Charles Ray  
Winchester, KY  
Page 1 of 1



Kentucky Pioneer Integrated Gasification  
Combined Cycle Demonstration Project  
Draft Environmental Impact Statement  
U.S. Department of Energy  
National Energy Technology Laboratory

### Written Comment Form

Must be received by January 4, 2002.

MR. ROY SPEARS  
I HAVE LIVED NEAR TRAPP KY. NEAR  
EAST KENTUCKY PLANT PROPERTY. I ATTENDED  
THE PUBLIC MEETING AT TRAPP SCHOOL ON DEC. 11, 2001  
WE DID <sup>NOT</sup> HEAR ANY ANSWERS TO ANY THING.  
EAST KENTUCKY POWER PURCHASED 3,000+  
ACRES TO BUILD A COAL FIRED PLANT  
I AND OTHERS REJECT TO ANY KIND OF  
GARBAGE TO BE ON THIS PROPERTY TO BE STORED  
OR TO BE BURIED IN A LAND FILL  
Charles Ray Parker  
P.S. I LIVED HERE ALL MY LIFE OF 71 YEARS  
CHARLES RAY PARKER  
1450 OLD LOG LICK RD.  
WINCHESTER KY. 40391

Please use other side if more space is needed.

Comment forms may be mailed to:  
Mr. Roy Spears  
U.S. Department of Energy  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Morgantown, WV 26507-0880

Comment forms may be faxed to:  
Mr. Roy Spears  
(304) 285-4403

### Comment No. 1

Issue Code: 21

Each of the public hearings was preceded by an informal open house during which members of the project staff were available to answer questions.

### Comment No. 2

Issue Code: 16

As discussed in Chapter 3 of the EIS, Section 3.2.2.2, Refuse Derived Fuel Pellet Production, RDF is made from MSW. However, the process is such that a sterile "mulch type material" is produced. The sterile mulch is then formed into dense pellets by being forced through a mold at high pressures.

RDF pellets are stable and durable because they are made with relatively low moisture content. The process in which RDF pellets are produced results in pellets with a relatively uniform size and shape. They also have a relatively low ash content and good handling and storage life before use. The concrete-floored storage building for the RDF pellets, located within the 4.8-hectare (12-acre) project site, would be capable of housing a 10-day supply of coal and RDF pellets. The 4.8-hectare (12-acre) project site is located within the larger 1,263-hectare (3,120-acre) J.K. Smith Site and is approximately 1.6 kilometers (1.0 mile) from the closest residence.

Pratt, Don  
Lexington, KY  
Page 1 of 1

From: <DBP91044@aol.com>  
To: <rspear@netl.doe.gov>, <james.watts@netl.doe.gov>  
Date: 12/29/01 12:00PM  
Subject: Re: DOE Extends Public Comment Period - KY Pioneer Energy IGCC Demo. Proj.

John Preston,

Thanks for the extension. I hope it is beneficial.

I, personally, am opposed to this construction, but am not scientifically versed well enough to comment on my greatest fear, the residue coming from the facility.

The human animal and such proponents of the IGCC have so little concern for the long term, and know their short term goal is profit or momentary pleasure, and not public service. Such would actually be best found in conservation measures, not their priority.

I am also concerned about the visual effect of the stacks from the top of Pilot Knob, a place I visit and hold dearly in my respect for the environment.

Not so humorously, I commented if you approve and they do build two stacks, that they be allowed to hang banners of and for advertising, even environment promos for themselves.

The hypocrisy would be more obvious.

- don pratt, 210 Walton Ave., Lexington, Ky. 40502.

NOTICE OF EXTENSION  
OF PUBLIC COMMENT PERIOD

The U.S. Department of Energy is extending the public comment period on the Draft Environmental Impact Statement (DEIS) for the proposed Kentucky Pioneer Energy Integrated Gasification Combined Cycle (IGCC) Demonstration Project at Trapp, Clark County, Kentucky from January 4, 2002 to January 25, 2002. Comments may be submitted by mail, fax, or electronically to: Mr. Roy Spears, NEPA Document Manager, U.S. Department of Energy, National Energy Technology Laboratory, P.O. Box 880, Morgantown, WV 26507-0880; FAX: 304-285-4403; e-mail: rspear@netl.doe.gov. For further information, please call Mr. Spears at 304-285-5460 or leave a message at 1-800-276-9851.

**Comment No. 1**

**Issue Code: 12**

Air and wastewater emissions from the proposed facility would be in compliance with air quality and NPDES permits. If emissions were to exceed allowable limits set by the air permit and the problem could not be remedied within 2 hours, the plant would be shut down to avoid being found in violation of the requirements of the air quality permit. The air and wastewater pollutants limits have been established to protect the public health and the environment.

1/12

2/22

3/04

Incremental ambient air quality impacts from the proposed project would be a very small fraction of the relevant federal and state ambient air quality standards (less than 1 percent for gaseous pollutants such as nitrogen dioxide, sulfur dioxide, and carbon monoxide and less than 4 percent of the federal 24-hour PM<sub>10</sub> standard). Therefore, the overall increase in air emissions due to operation of the plant would be very low and present little risk to human health and the environment. KPE is uncertain about the residue referred to by the commentor as coming from the facility.

The management of other waste streams associated with the proposed project is discussed in Section 5.13 of the EIS, Waste Management.

**Comment No. 2**

**Issue Code: 22**

Comment noted. The Kentucky Pioneer IGCC Demonstration Project was selected for further consideration under DOE's fifth solicitation (CCT-V) of the CCT Program. The purpose of the CCT Program is to provide a cleaner and more efficient source of energy from coal resources.

**Comment No. 3**

**Issue Code: 04**

Comment noted. Impacts to the aesthetic and scenic environment of the project area are presented in Section 5.5, Aesthetic and Scenic Resources, of the EIS.